IN THIS ISSUE: Engineering and Commercial Discussions at Coronado

JOURNAL OF ELECTRICITY

VOL. 42. NO. 10 SAN FRANCISCO, MAY 15, 1919 PER COPY, 25 CENTS

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JOURNAL OF ELECTRICITY

FOUNDED 1887

ROBERT SIBLEY, Editor — CLOTILDE GRUNSKY, Associate

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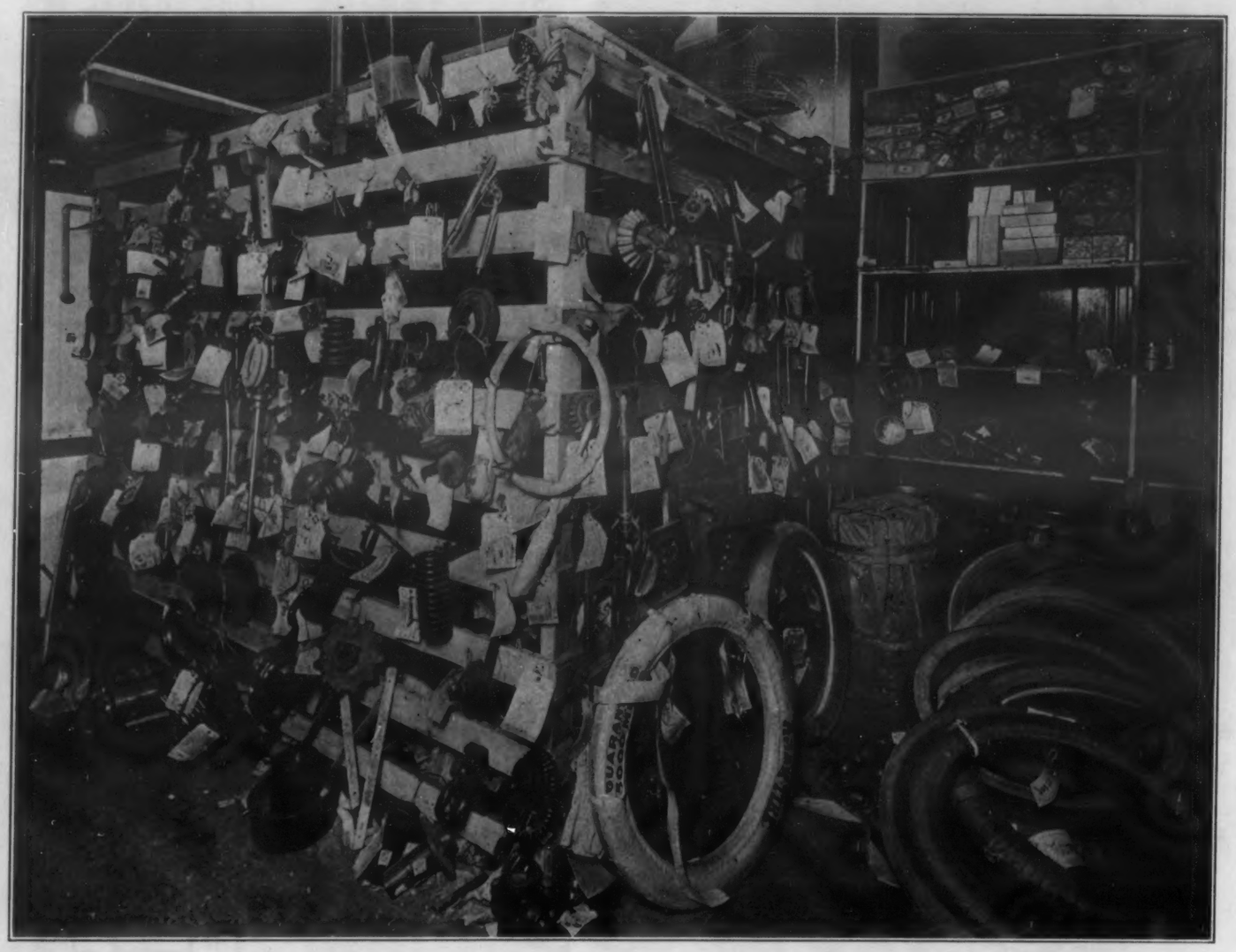

FROM the shipping department of the electrical retailer, the wholesaler and the manufacturer flow daily a stream of packages whose fate is entrusted to the express company — with what inadequate safeguards is to be judged from this picture. This is merely one corner of one department of a No Mark Bureau, made necessary by the thousands of packages sent monthly without any address whatsoever, or with the mark illegible. The express company's damage claims, in spite of every precaution, mount into millions of dollars yearly, largely on account of improper wrapping and of such cases as these.

"Mark Right
Pack Right"

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MAY 26 1919

JOURNAL OF ELECTRICITY

DEVOTED TO THE UPBUILDING OF THE ELECTRICAL INDUSTRY IN THE WEST AND IN THE COUNTRIES BORDERING THE GREAT PACIFIC

Volume 42 SAN FRANCISCO, MAY 15, 1919 Number 10

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THE CORONADO CONVENTIONS

The outstanding feature of the recent Coronado conventions, comprising as they did representatives from all branches of the electrical industry in the states of New Mexico, Arizona, and California and an investment of nearly three-quarters of a billion dollars, was the remarkable directness with which deep and perplexing problems facing the industry were attacked and terse conclusions drawn.

First and foremost among these conclusions must be mentioned the hearty endorsement expressed on all sides looking toward the development of self-determination in so far as problems are of common interest and contact can be maintained with all parties to the issue. Thus, expression was heard among engineers on all sides endorsing the strong emphasis of section development and the utilization of the national body as the clearing house of discussion between sections. Again, the appointment of local representatives on national committees it was urged should be made only after consultation with local committees covering the same phase of engineering investigation. This idea was also strongly expressed in the resolution declaring against the promulgation of a national Code of Ethics by the Bureau of Standards, as it is felt that personal contact with actual problems met in the industry demands leadership on the part of state regulatory bodies rather than the national body at Washington. Then, too, due to the fact that the California Electrical Cooperative Campaign has worked out such wonderful results in coordinating the industry, a general expression of sentiment favored this size of unit as the best for contact in our present development, and while all agree that a national campaign or organization is desirable, the feeling is emphatically expressed that such an organization should serve rather as a clearing house and not as a governing body.

In the matter of automatic control of small power plants, great steps forward were heralded at the Coronano conventions and unquestionably the development of many of the countless small water power projects existent throughout the West has been given an impetus that will be felt in the economic life of our nation. But the feature that stood out foremost along engineering discussion in the Engineering Committee report, the Public Policy Committee report and the Committee on Resolutions, was the evident conviction that railway electrification is upon us. Full cooperation has been pledged to the San Francisco Section of the American Institute in its earnest investigation of this problem by a number of the foremost electrical engineers of the West, as previously announced in these columns.

The growth of the code of ethics promulgated by the California Electrical Cooperative Campaign, based on the fundamental principle that "he profits most who serves best," was another outstanding feature of the convention. The Resolutions Committee report fairly rings with endorsement of this principle and it is even urged that foreign commercial and engineering policies, now matters of such vast importance in Pacific Coast ports, be shaped along similar lines and thus assist in assuring the peace of the world.

But above all other considerations the inspiration gathered by following the words uttered by the president of the California Railroad Commission at the banquet was perhaps the most interesting and helpful thing that transpired. Here was an audience of five hundred gathered together in banquet for a frolicking farewell after arduous labors of a week of convention discussion. Yet when put to the challenge by the president of the Railroad Commission as to whether the present vast economic scheme of utility development in the West would meet the demands of service, the attitude of the audience, clearly showed by the thoughtful attention given the speaker, that men of the electrical industry in the West consider the choice between private ownership and public ownership not the challenge,—but that the real point at issue is the sensing of a need for service. To him who senses that need for service and supplies that service at a just and reasonable cost will eventually be granted the privilege of serving his fellow man to the highest degree attainable.

The president of the Railroad Commission was pleased to compliment his audience upon the fact

that the electrical industry in the West had attracted to it the brightest and keenest brains produced in the nation. To the close observer of modern trend of thought, this must be admitted to be a fact. It is well for us to seriously ponder this conviction and what it means. It means that men of the West today engaged in this industry will unquestionably have a part in formulating many of the policies during the next decade that will go toward shaping the destinies of the world in this gigantic period of readjustment—and in the words of the president of the Railroad Commission, while we are not ready to say out-and-out that complete success will be theirs, yet our conviction is such that we are ready to place a bet.

Prices and the Business Situation

It is a strange situation when business men go about optimistically patting each other on the back and saying by way of words of cheer, "Well, I don't believe prices are going down." Yet that is just what is happening in the United States today. And it is not the prices at which they sell their product to which they refer, either, but rather the cost of the raw materials and labor they are going to have to pay to produce it. Literature is at hand in large quantities from such agencies as the Division of Public Works of the United States Department of Labor—and even from private manufacturers and commercial organizations, all coming to this same conclusion.

The object in view, of course, is the encouragement of the prompt resumption of business on a normal scale. In the meantime, irrespective of prices and their future tendencies, business seems to be going ahead at a steady gait. "It is still one of the wonders of the time," says a recent bulletin from the Chamber of Commerce of the United States, "that the present volume of business continues so large." This is in spite of the fact that building and construction, which are usually the barometers of general business, have not yet resumed anything like normal volume. However, the outlook even in this field is reported as better and the expectation is for an increase during the next four months of from fifteen to twenty per cent in the volume of building compared with the same period last year. Along some few lines, such as copper, which were inflated to meet a demand entirely abnormal, prices have dropped precipitously and mines are operating at only half capacity, but in general price reductions are moderate and seem to act as a stimulant to buying rather than as a deterrent.

Home Wiring in the West

The district west of the Rocky Mountains is inclined to be skeptical on the subject of home wiring campaigns. In the knowledge that power consumption per capita in this great region is four times as great as that elsewhere in the United States, that homes and farms are in most districts fully ninety per cent wired, it is figured that a campaign to reach the other ten per cent would hardly pay.

This is, however, a short-sighted view. To be sure Pasadena, California, is reported as having every house in the city wired and connected—with a population of 42,000 there are said to be 15,600 meters—but few cities are in this condition. It is interesting to note that the contractor-dealers of the adjacent city of Los Angeles recently discovered to their surprise that that city has probably some six or eight thousand homes which are without electricity. How many of the homes which are wired are fitted out with up-to-date conveniences of outlets and remote control switches which provide the inhabitants with an incentive to make full use of their electricity? The realization of the value of convenience outlets has been a more or less recent development—and the fact that most of the houses of a city were wired early in the history of this electrical era, may be just the reason for their needing additions and improvements to the wiring at the present time.

Census statistics show that approximately 9,000,000 homes in the United States are lighted by electricity—nearly twice that number are using gas or coal oil. Statistics fail to show, moreover, how well lighted those electrically wired homes are. One manufacturer estimates that they contain more than 10,000,000 empty lamp sockets. How many electrical appliances are idle and how many unsold to customers whose houses are not conveniently wired for their use? You may saturate your market numerically—the wants of man are never satisfied. And the basis of the ability to meet these ever-growing wants is modern house wiring.

Business and the Study of Languages

The Americanization of the foreigners who come to our shores is one of our first duties. The foreign school which encourages the failure to learn English and the foreign organization which speaks and thinks in terms of the civilization from which it has come, should be done away with—by law if necessary. But this worthy campaign for the bettering of our foreign citizenship should not be construed as an argument for the prevention of the study of foreign languages by our own young people. There has been too great a tendency in our schools—and even in recent sessions of state legislatures—to discourage the study of foreign languages altogether.

Americans, perhaps as a consequence of their isolated position, have always been far behind Europeans as linguists—and in consequence have suffered greatly, not only in the absence of widespread ability to keep up with technical advance, but in the practical intercourse of foreign trade. How important is the knowledge of Spanish can only be judged by those who deal with Mexican and South American firms. Tales of what is really said by the interpreter to customers in China are part of the stock of good stories possessed by almost every business man familiar with the Orient. Time and again the criticism is made of American business in the foreign field, that its agents are at a disadvantage with those of England—or Germany, or Japan—because

dependent on interpreters in their intercourse with the field.

The new world order about to be established lends a new significance to this question. It has truly been said that if the world could speak one language, ninety per cent of the dangers of war would be removed. We could advertise our various brands of democracy and ideals to the peoples of the world rather than to the few in charge and give them a chance to choose between the advertised goods on the basis of a value which they understand. The next best thing to a universal language, of course, is the wide understanding of many languages.

A National Department of Public Works

The need for an engineering representative in the cabinet who shall have supervision of all public works under national direction has long been felt. There are at present engineering works being carried on under five different departments, not to mention separately constituted commissions for the direction of individual undertakings, such as the Panama Canal. That such work should be coordinated, so that it may be planned as a whole and carried out as parts of one great enterprise, is a proposition which hardly needs defense. It is only the inertia of the present situation, the difficulties of readjustment and in some measure the unwillingness of those now handling the undertakings to relinquish their authority which stand in the way of its immediate accomplishment.

The conference of engineering societies held on April 23-25 in Chicago for the purpose of discussing the establishment of a Department of Public Works has taken the first step toward the desired end. The details of this meeting are reported elsewhere in this issue. It was composed of delegates from engineering societies throughout the United States — one from each organization represented — and may be considered as representative of the opinion of the engineering profession.

The major action of the conference was the unanimous adoption of a resolution favoring the establishment of a Department of Public Works and the recommendation as to the work which should come under the supervision of that department. The recommendation provides for the establishment of this department by the grouping of government bureaus, services and other activities whose functions are predominantly of an engineering or architectural character under what is now the Department of the Interior and thereafter designating that department "The Department of Public Works." This forestalls any objection on the part of legislators to the creation of an additional cabinet position. The personnel, compensation and general plan of organization of these bureaus is to remain the same, readjustments in the interest of simplification and coordination, or later expansion, to be met as the needs arise.

Appreciating that one of the major difficulties confronting the transfer will be the removal of river and harbor work from military supervision, it is suggested that the relation of the army engineers to such work be not changed and that there should be no relinquishment of non-military duty by the Army engineers now on such duty until their transfer to military duty can be made without detriment to public interests.

The bureaus and activities which are selected as logically belonging in a Department of Public Works are—

A Bureau of Public Roads.
The U. S. Reclamation Service.
The Alaskan Engineering Commission.
The Construction Division of the U. S. Army.
A Bureau of River, Harbor and Canal Work, including such functions as are now exercised by the Mississippi River Commission and the California Debris Commission.
A Bureau of Architecture.
A Bureau of Surveys, including the Coast and Geodetic Survey.
A Bureau of Mines.
A Geological Survey.
The Forest Service—at least until the same is divorced from the supervision of water powers and road building.
The Bureau of Standards.

It was considered unwise at this time to determine to what extent the proposed Department should control the activities of the General Land Office, the National Park Service, the Bureau of Lighthouses, the Bureau of Indian Affairs, and of the Public Health Service and various commissions and these were left for consideration at a later date, preferably until the department had been organized.

The action taken by this representative congress for the first time puts the proposition of such a national engineering department in the realm of possible realization within the near future. It is to be expected, of course, that there will be some opposition on the part of departments now supervising the expenditure of the moneys involved, but the mere excuse that present conditions grew up naturally owing to a failure to foresee the importance of engineering as a national factor should not be permitted to stand in the way of betterment. Nothing more vital to efficiency and constructive accomplishment along national engineering lines has ever been attempted—this proposition deserves the united support of engineers, individually and through their organizations.

NEW JOURNAL SERVICE: Plans for issues ahead include a feature article on Electrical Installations on Shipboard by F. A. Anderson, electrical inspector with the U. S. Shipping Board, to appear in the June 1st issue; a description of the interesting technical features of Montana's new copper mill—an electric heating number, and a vacation number. Watch for articles of particular value to your particular needs.

Especial attention is called to the fact that it is still possible to enter for the course on practical electricity offered by the Extension Division of the Universities of California and Oregon in cooperation with the Journal of Electricity. Four articles of the series used as a text have already appeared but back numbers can be furnished those entering late.

Packing for Shipment by Express

BY J. C. HARRAMAN

(A million dollars a month loss from shipments through the express company—how much of it is yours? If you have shipments go astray, it is probably your own fault, as you will be convinced after reading the following article. This interesting survey of express conditions formed part of a paper read before the San Francisco Development League. The author as claims agent with the American Express Company is familiar with the shipping practices of most electrical establishments in the West.—The Editor.)

The Express Company has seriously set itself the task of improving the express service throughout the country. The consolidated express companies operating under government control present a unified service, which can and must be efficient. The American Railway Express Company today, with the single exception of the post office, furnishes probably the most extensive service, territorially speaking, of any single institution in the world. It operates over 300,000 miles of railroads (using every railroad in the country) and steamship lines, maintains 35,000 offices and employs 125,000 men and women, and uses thousands of horses and wagons and motor vehicles.

Two packages of small items which were done up in a single wrapping paper with one turn of the string about them. They should have been shipped in a box securely tied within the outer wrapper as well as without.

Claims —

The first subject to receive the attention of the express management in this campaign is that of claims, which are the cause of more waste in time and money, and more dissatisfaction and ill-feeling on both sides than anything else connected with the business. In the final analysis the express company has decided the best way to treat a claim is to prevent it, and that they are determined to do wherever possible.

An example of optimism. Whoever packed these heavy bundles of clothing in paper cartons and expected them to arrive in good condition was at least as trusting as some of the shippers in electrical establishments who pack heavy hardware in paper containers.

Loss and Damage —

To give you an idea of the magnitude of the loss and damage situation which the express company faces, suffice it to say that the loss and damage account is now running over a million dollars per month, while the profits have constantly decreased

The stream of packages which passes through the hands of the express company is very large and very assorted—it is congested at certain times of the day—it must be handled to meet train schedules. It is no wonder that packages must be compactly packed and adequately protected to withstand the necessary routine handling. This is the cone — the electrically operated rotary conveyor at the Ferry Building, San Francisco, by which the lighter packages are handled.

until the company has operated at an actual deficit since the consolidation.

Theft —

It would be useless for the express company to attempt to conceal the fact that they, in common with other transportation agencies, suffer severely through the stealing of packages, principally through operations outside their own forces. They are waging a relentless warfare on this evil. The railroad administration organized a secret service and police section under direction of W. J. Flynn, formerly Chief of the United States Secret Service, with whom the local operatives are cooperating.

Frequently the exposure of the contents of a shipment will cause a loss through theft that would not have occurred had not the exposure presented both the suggestion and the opportunity. You can assist by guarding against such exposure. Also for the purpose of preventing thefts, you are urged earnestly not to place on packages labels disclosing the nature of their contents, except in the case of glass or fragile articles, in which case caution labels should be used—and in the case of liquor. In the case of glass, to inform the express employes of the nature of the contents so such packages may be handled according to their requirements, and in the case of liquor because it is obligatory by law.

This trunk was not delivered to the correct address—it went clear across the continent on an address over two years old. But then, you can see the choice of destinations open to the expressman. Its owner had been traveling around the world and neglected to remove the old tags.

The owner of this chair was told to take it back and crate it before it would be accepted for shipment. Instead he sewed it up in burlap and this is what happened to it. If the express company refuses your package you may know that it is with your interest in mind.

Improper Marking and Packing —

If just those claims which result from improper packing, wrapping and marking of express shipments could be eliminated, the greater part of our difficulties will be overcome. In the last few years the increased cost and shortage of proper wrapping and packing materials have induced many shippers to adopt a policy of unwise economy, whereby they use inferior packing, not sufficiently substantial to withstand damage from ordinary handling in transit.

Let me explain briefly what I mean by ordinary handling in transit. The express business must be done with speed, the bulk of the shipments are given the express company in a comparatively short period of the day, everything must be dispatched promptly and loaded on cars, handled on trains scheduled to leave at definite times. Express shipments are of all sizes, dimensions and weights. All packages cannot be loaded on top, nor can express shipments be arranged on platforms or trucks before loading in order that the heaviest express matter can be loaded on the bottom. Therefore all packages should be substantially packed to withstand the lateral pressure of the load, and the vibration of the train, whether loaded on the bottom or on top.

Second Hand Containers —

The use of old or second hand cartons or other containers is a particularly fruitful cause of claims. If these cartons or containers do not break open, they can almost certainly be depended upon to send the shipment astray on an old mark. A tracer will never locate such a shipment, for it is always traced as going to its correct destination. The express company know from experience that they have paid a great many claims on shipments of this kind. The fact that the shipper is not guilty of an intentional imposition on the carrier does not lessen the hardship on the company nor justify the collection of such claims.

Aside from the matter of second hand containers, the mistakes in marking shipments are legion. The mistakes of the shipping departments may be kept from the heads of the house, but they are never kept from the express company. Many of them grow into claims. If these claims are paid, the express company asumes a loss it should not bear. If they are not paid, and in all fairness they should not be, the shipper stands a loss that the exercise of care would have prevented. No matter which way the case is disposed of, both parties suffer annoyance and dissatisfaction and waste much time that could be and should be devoted to other matters.

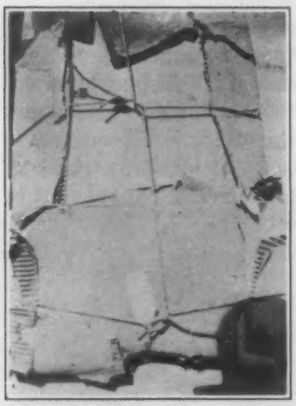
Proper Marking —

I might explain that proper marking means putting the address of both the shipper and the consignee on the outside of the package in plain and legible characters that will not rub off or become obliterated in ordinary handling. At this point permit me to urge the importance of also placing the consignee's name and address inside the shipment, particularly if it be a trunk, suitcase, valise or sam-

ple case. Many a shipment that has lost its identity or is found traveling on an old mark is identified and sent to its proper destination from information found inside it. In no conceivable situation is inside information more important or more helpful than in this.

Do Not Use Tags —

A tag should never be tied to an article when the proper marks can be written, nailed or pasted on



One of the largest electrical manufacturers in the country sent this package through a Western branch — entirely without an address. The tag which is so bravely attached at the lower knot is blank.

the article itself. All marking should be done with crayon, lamp black or ink. When it is necessary to use tags, place at least two on each article, and fasten them with wire or heavy cord, depending on the nature of the article. Wire should always be used on hardware, and in such cases the tag should have an eyelet that the wire will not cut through. This great care in the use of tags is necessary because of the ease and frequency with which they are torn off in the necessary handling, stacking and shifting of express matter.

No Advertising on Tags —

Such tags as are used should not contain advertising matter, which frequently causes shipments to go astray even when the tags are not lost, and I am sure you will agree that there is little merit if any in such advertisements. Unless unusual care is exercised, these tags put a sort of reverse English on the shipment, and turn it back to the shipper before it reaches its destination, because the names of the shipper and the consignee are transposed from their regular order.

I call to mind one instance where the Hartsook branch at Santa Rosa sent a typewriter to the Underwood Typewriter Company, San Francisco, for repairs. They addressed it 530 Market Street, which is the address of the Wholesale Typewriter Company from whom the machine was purchased. An investigation developed, however, that the shipment was not delivered to either of these but to the Hartsook main office in San Francisco, who never reported the matter.

Baggage —

With no class of shipments is correct and secure marking more important—and less frequent—than personal baggage, such as trunks, suitcases and valises. It is estimated that eighty per cent of lost baggage goes astray on old marks. The surest way to locate a lost piece of baggage is to learn between what points it was previously shipped. No other shipments cause more serious losses than do these, and many of these losses cannot be measured or compensated in money.

An instance of this kind I think of at this time is where the Rev. Smith, a minister of the gospel, shipped from San Francisco to Carmel By The Sea five trunks—the company delivered but four. The reverend gentleman kept the wires hot searching for his lost trunk and the company could not find it by tracing. They inquired as to between what points it had previously been shipped and were very much discouraged when told he had been traveling around the world, but in this country he had visited most large cities — Washington, Baltimore, Philadelphia, New York, Boston, Utica, Syracuse, Buffalo, Chicago, Seattle, Portland and San Francisco. They searched through some 15,000 or 20,000 documents for the shipping date and found a trunk waybilled to Smith, Utica, N. Y. After wiring Utica they located Mr. Smith's trunk, which had moved on a mark two years old.

No Mark Bureaus —

As some of you have occasion to know, the express company maintains what they call No Mark Bureaus. They have nineteen of these throughout the system. In the year 1918 they found over

An entire truck load of damaged packages. This is striking evidence of the fact that most losses are due to packing heavy articles in wrappings which are inadequate. Expensive furs have been known to be sent in the flimsiest of parcels—heavy iron castings in a paper box tied with string.

300,000 shipments sent Without Mark. From July 1st to November 30th, 1918, they received in these Bureaus 127,859 shipments, an average of over 25,500 per month. While these represent but a comparatively small portion of the total shipments received in the same period, they indicate a situation that calls for drastic action, not only by the company but by the shipping public. I might add here that the express company handles approximately 300,000,000 shipments a year, an average of a million transactions a day. These Bureaus receive only shipments entirely without mark, those on which the marks cannot be made out, and those sent to destinations that do not exist. A little less than fifty per cent of these shipments are what is termed hardware, such as castings and other articles made of metal. In September, 1918, the total No Mark shipments were 26,948. Of these about 42 per cent, or

10,952, were hardware. Because of the nature of these shipments and the difficulty of describing them properly for tracing purposes, few of them are identified with claims. Most of them are sold as junk or scrap iron for practically nothing compared with what is probably paid for them in claims.

Automobile Tires —

Automobile tires or casings found without mark average about 1400 per month. Shippers too often bind several of these together with paper, or by means of flimsy crates, which will not hold them. They should be securely fastened together with rope or burlap. The marks should be securely attached, and the name and address of both the shipper and consignee should be placed inside each casing as an added precaution in case the tires become separated.

Personal Baggage —

About 1500 pieces of personal baggage find their way into these Bureaus every month. How many disappointments and blasted hopes of pleasant vacations, how many unattended parties, do you suppose these represent? And they could all have been avoided by the exercise of proper care in starting the shipment right, for none of these shipments were lost or stolen; they simply went astray because they had been turned out into a cold world without proper credentials.

The balance of the shipments received in these Bureaus embrace everything that is movable. The Bureaus are maintained at great expense, and, while they do highly efficient work in matching up shipments with claims and complaints, they represent the expenditure of time and money that should be devoted to constructive work and the improvement of service to the public.

If this condition exists with regard to marking alone, you can well understand that the losses resulting from the improper or insufficient packing or enclosing of shipments must be almost beyond comprehension. Think of the time and money that shippers must spend in handling claims on such losses, to say nothing of the time and money that they cost the company. Isn't it reasonable to say that the company could give you much better service, and that you would be much better satisfied if all could be relieved of this great burden?

Express Company Should Not Accept —

It may be urged that the express company should not accept packages that are not properly marked and prepared. That is quite true. But they have suffered along with all of you on account of labor conditions. It is part of their present work among their own men to see that they do exercise proper care in this respect, in the interest of the shipper as well as in the company's interest. You will agree with me that there is some room for improvement on both sides when I tell you that in many instances the inspectors have found some of the packages offered to the company in large quantities in shipping rooms and on the sidewalk to be not only incorrectly marked when compared with the receipts, but to be entirely unmarked.

Possibly some of you will feel that this can have no application to your own establishment. Work along this line that the express company has already done has demonstrated that too frequently the head of the house has had little actual knowledge of what goes on in his own shipping department. Many a shipper who has resented what he termed unwarranted criticism of his shipping department, or who has taken the position that his shipping force was entirely competent and dependable and that he refused to be bothered with details that he paid others to look after, has been surprised and stirred to action when the express company has finally induced him to take a personal interest in this important part of his business. Frequently they have been able to do this only by taking in at the front door what they have received at the back door. The company has no quarrel with shipping clerks as a class. They say only that they are human like the rest of us and that the proper preparation of express shipments is so necessary to a successful business that it warrants the same personal supervision by the owner of the business that he gives to buying and selling.

One important reason why express claims should be reduced that has a peculiar appeal to shippers and consignees alike is that a shipment is never made for the purpose of having it result in a claim. The prudent shipper, with an eye to future business, wants to deliver the property to the consignee; and the consignee wants that same property, intact and on time, for himself or for a customer. The payment of a claim does not satisfy either.

Tracing Shipments —

Permit me to urge the importance of not requesting the express company to trace a shipment until you have positive advice from the consignee that he has not received it. The consignee's letter, or a copy of it, should be attached to your request for a tracer. The unnecessary tracing of shipments has become a serious burden to the express business and will have to be eliminated in the interest of Better Service.

Some of you may be called upon before long to arbitrate a dispute between your shipping clerk and one of the express company's men as to whether a certain shipment is in proper shape as to packing, wrapping and marking. If you are, please bear in mind that the company's employes, in insisting that shipments be properly marked and prepared, are acting under instructions promulgated for your good as much as for the company; and please make sure that your shipping clerk is doing all that you would do personally in his place before you pronounce judgment.

A shipment is never made for the purpose of having it result in a claim.

Many a shipper has been surprised and stirred to action when the express company has finally induced him to take a personal interest in his shipping department.

The express company's employes in insisting that shipments be properly marked and prepared are acting under instructions promulgated for your good as much as for the company.

Cost of Fuel for Steam-Electric Stations

BY WILLIS T. BATCHELLER

(Every power plant must determine the fuel most suited to its particular needs and most economical to its particular situation. For the purpose of facilitating the determination of fuel costs a convenient set of curves has been worked out by a power man of the northwest and is here given with an explanation and several problems showing the method of practical application. The author is connected with the Municipal Light and Power Plant of Seattle, Washington.—The Editor.)

The unprecedented increase in the cost of the various fuels used in steam plants has made it highly desirable for companies removed from the source of fuel supply to carefully analyze the situation with a view to determining the most economical fuel for their particular location. This is true not only of proposed installations, but also of existing plants where the possible saving caused by a change of fuel should be considered. With existing plants the fixed charges including interest on the investment, depreciation, operation and maintenance, exclusive of fuel cost, are known and with projected plants they can be estimated with a reasonable degree of accuracy. It is then only necessary to add to these fixed charges the fuel cost, to determine the total cost of generation.

For more readily determining the fuel cost in any plant, curves have been prepared which may be applied to nearly any case found in practice, and from which the fuel cost may be obtained directly without making laborious computations.

Figure 1 shows the net calorific value of fuel in B.t.u. per pound with various percentages of moisture in the fuel as fired. These curves were plotted from computations based on the well known equation.

$$\text{Loss in B.t.u. per pound} = W\ (212 - t + 970.4 + 0.47\ (T - 212))$$

Where W = per cent of moisture in fuel
t = temperature of air in the boiler room
T = temperature of flue gases
0.47 = specific heat of superheated steam at atmospheric pressure and at flue gas temperature.
$(212 - t)$ = B.t.u. necessary to heat one pound of water from the temperature of the boiler room to 212 degrees
970.4 = B.t.u. necessary to evaporate one pound of water at 212 degrees to steam at atmospheric pressure
$0.47\ (T - 212)$ = B.t.u. necessary to superheat one pound of steam at atmospheric pressure from 212 degrees to temperature T.

Figure 2 consists of four correlated sets of curves. The first one in the upper left hand corner gives the evaporation from and at 212 degrees, with fuels having various net calorific values and with boiler efficiencies as indicated. The second set of curves shows the pounds of fuel burned per kilowatt hour generated with various values of evaporation and station economy in pounds of steam from and at 212 degrees F. per kilowatt hour. The third set shows the amount of fuel burned in thousands of pounds per hour and per day for steam-electric stations of various capacities from 1000 to 100,000 kilowatts. At the right and left sides of these curves, scales are provided for reading directly the amount of fuel burned per hour and per day, when fuel oil and mill waste respectively are used. If so desired, the daily or hourly cost of fuel may be obtained by multiplying the quantity expressed in the desired units by the unit cost of the particular fuel used. The fourth set of curves shows this cost graphically for fuel costs per thousand pounds from forty cents to six dollars. The price per thousand pounds of coal is obtained by dividing the cost per short ton by two. For oil the price per thousand pounds is obtained by dividing the cost per barrel by 0.336 or for practical purposes, the price per barrel may be multiplied by three. One unit, or 200 cubic feet, of mill waste weighs 3600 pounds, so the price per unit must be divided by 3.6 to determine the price per thousand pounds.

Problem 1. Fuel Oil.

With fuel oil having a net calorific value of 18,500 B.t.u. per pound, costing $1.00 per barrel, what will be the cost of

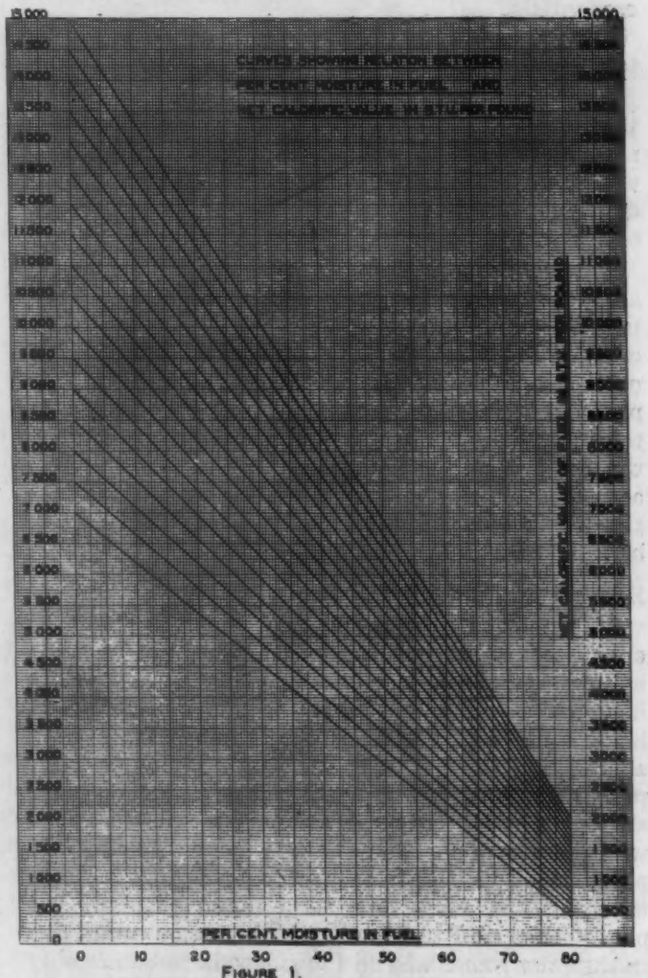


FIGURE 1.

The net calorific value of fuel in B.t.u. per pound with various percentages of moisture in the fuel as fired.—Figure 1.

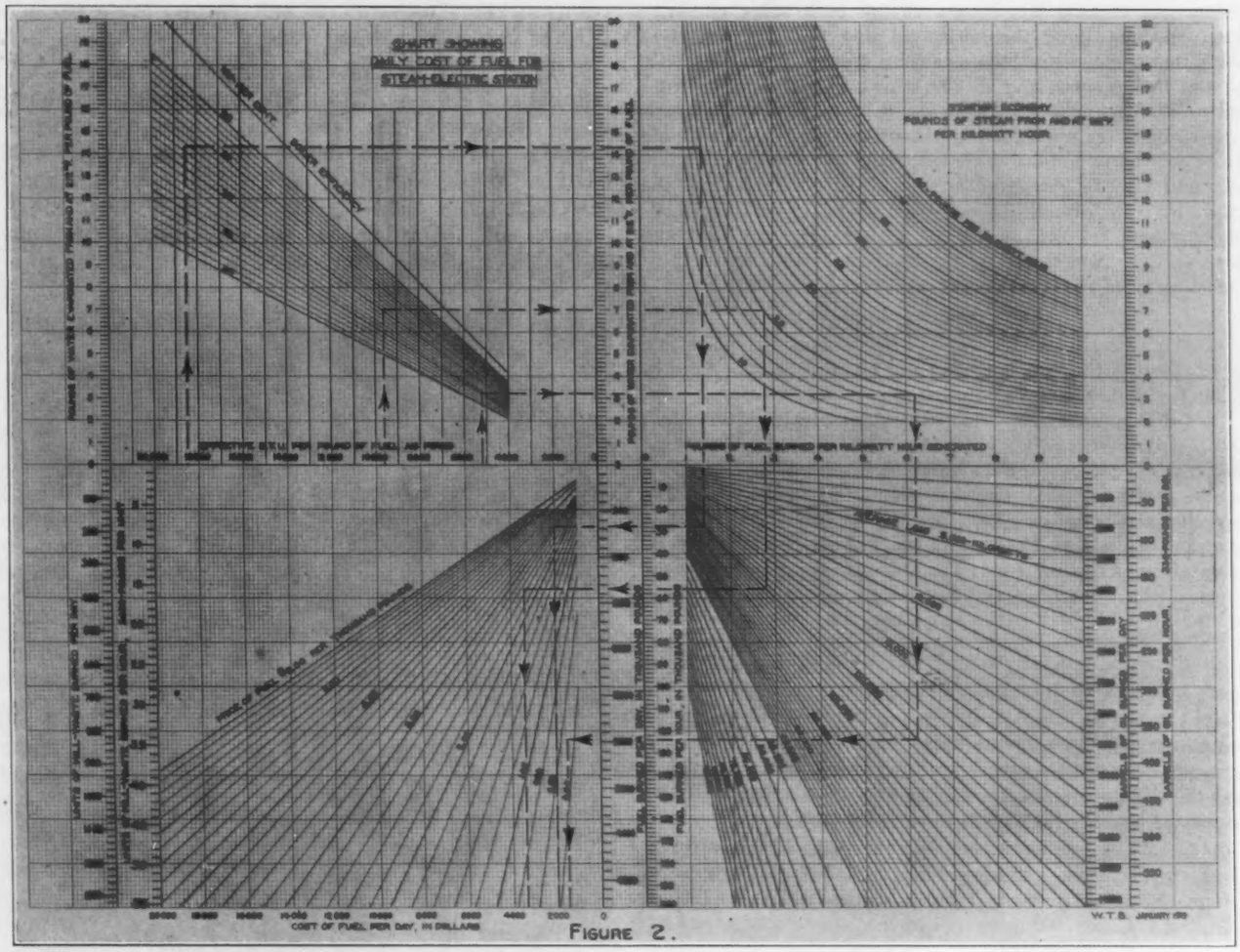


FIGURE 2.

Four correlated sets of curves. Upper left hand corner—the evaporation from and at 212° with fuels having net calorific values and with boiler efficiencies as shown. Upper right—the lbs. of fuel per kw-hr. with various values of evaporation and station economy. Lower right—amt. of fuel burned per hr. and per day for steam electric stations of various capacities. Lower left—the cost for fuel per 1000 lbs. from 40 cents to six dollars. See text for methods of using curves.

fuel per day in a steam-electric station of 20,000 kilowatts capacity, having an average boiler efficiency of seventy-five per cent, and an average steam consumption per kilowatt hour of twenty pounds of steam from and at 212 degrees F.?

Starting at 18,500 B.t.u. on Figure 2, follow the vertical line to the 75 per cent. boiler efficiency point and obtain an evaporation of 14.3 pounds of steam from and at 212 degrees F. on the horizontal line. Follow the horizontal line until it intersects the 20 pounds station economy curve and drop vertically. The pounds of fuel per kilowatt hour generated are shown to be 1.4 pounds. Continuing down the vertical line to the 20,000 kilowatt load line, turn to the left and find the fuel per hour to be 28,000 pounds or about 670,000 pounds per day. As the fuel considered is oil, the horizontal line may also be followed to the right hand scale and the amount per hour and per day will be found to be 83 barrels and 2000 barrels respectively. As the price is $1.00 per barrel, the above numbers of barrels represent the fuel cost per hour and per day directly. To illustrate the procedure for other prices of oil, follow this same horizontal line to the left until it intersects the line representing a price of $3.00 per thousand pounds which corresponds approximately to $1.00 per barrel. Then drop vertically to the lower scale and read $2000.00 per day, the cost of fuel.

Problem 2. Coal.

With coal containing 15 per cent moisture and having a calorific value of 11,500 B.t.u. per pound of dry coal, and costing $5.00 per short ton, what will be the cost of fuel per day in a steam-electric station of 20,000 kilowatts capacity, having an average boiler efficiency of seventy-five per cent and an average steam consumption per kilowatt hour of twenty pounds of steam from and at 212 degrees F.?

On Figure 1, start at 11,500 B.t.u., go down the diagonal line to the line representing 15 per cent moisture and read 9,600 B.t.u. net calorific value. On Figure 2, start at the 9,600 B.t.u. point, follow the vertical line to the 70 per cent boiler efficiency line and continue on the horizontal line to the intersection with the 20 pounds station economy curve. Drop vertically to the line representing 20,000 kilowatts and turn horizontally, intersecting the line for $2.50 per thousand pounds. Drop vertically to the lower scale and read $3,400.00, the daily cost of fuel.

Problem 3. Mill Waste.

With mill waste containing 30 per cent moisture, having a calorific value of 8,000 B.t.u. per pound of dry fuel, and costing $1.80 per unit of 200 cubic feet weighing 3,600 pounds, what will be the cost of fuel per day in a steam-electric station of 20,000 kilowatts capacity, having an average boiler efficiency of sixty per cent and an average steam consumption per kilowatt hour of twenty pounds of steam from and at 212 degrees F.?

On Figure 1, start at 8,000 B.t.u., go down the diagonal line to the 30 per cent moisture line and read 5,250 B.t.u. net calorific value. On Figure 2 start at the 5,250 B.t.u. point,

follow the vertical line to the 60 per cent boiler efficiency line, continue along the horizontal line to the intersection with the 20 pounds station economy curve. Drop vertically to the line representing 20,000 kilowatts and turn horizontally, intersecting the scale at the extreme left of the sheet. The amounts of mill waste per hour and per day are found to be 34.4 units and 826 units respectively. The cost at $1.80 per unit may be computed or it may be obtained from the curve by transforming the cost per unit to the cost per thousand pounds by dividing by 3.6, giving $0.50 per thousand pounds. The intersection of the horizontal line with the fifty cent line gives the cost per day of $1500 on the lower scale.

Problem 4. Equivalent Prices.

With the above fuel prices and operating conditions, what must be the prices of coal and oil to equal the price of $1.80 for mill waste, based on fuel cost only?

On Figure 2, project the line representing $1500 fuel cost per day for mill waste, until it intersects the horizontal lines for oil and coal. Read at these intersections the prices per thousand pounds. The equivalent price of coal is $1.10 per thousand pounds or $2.20 per ton and of oil is $2.20 per thousand pounds or $0.66 per barrel. This is correct for a comparison of fuel costs only and also for the entire operating expense where the fixed and operating charges are the same for the three kinds of fuel. For other cases, the variation in these fixed charges should be considered. With a certain total daily generating cost for one fuel known, the sum of all charges excepting fuel cost for a second kind may be subtracted from the first total, leaving the amount available for purchasing the second kind of fuel. This fuel cost may be used as the starting point on the bottom scale of Figure 2 and this line projected upward to the intersection with the horizontal line for the first fuel as in Problem 4.

In case it is desired to obtain the daily fuel cost for a plant smaller than can be readily read from the capacity curves, the actual capacity may be multiplied by 10, 100 or 1000 and the final result divided by the same factor, thereby facilitating the operation.

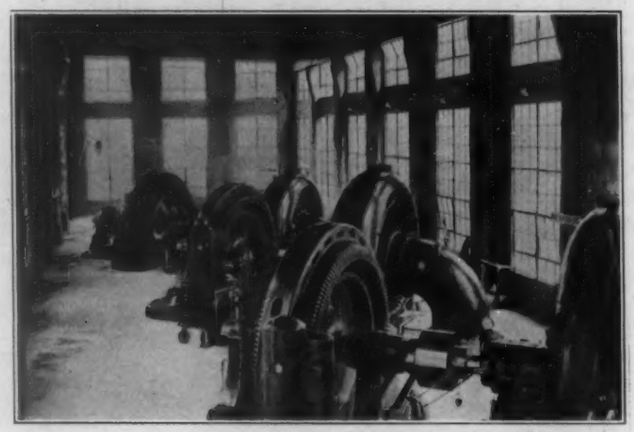
PELTON REACTION TURBINES IN PAPER MILL POWER HOUSE

(Additional data on the interesting mill installation described in the Journal of Electricity for March 15 are here given which bring the record of equipment up to date. The Northwest has particular advantages of location for lumber and paper enterprises such as this, in the close proximity of the raw material to the water power and of both to the shipping facilities.—The Editor.)

The hydraulic equipment in the present power house of the Ocean Mills Plant of the Pacific Mills, Ltd., consists of three Pelton reaction turbines, direct driving alternating current generators. Two of the turbines are of the single discharge type, the runners being mounted on the overhang of the shaft, which is supported by a massive combined main and thrust bearing. Each shaft, in turn, is direct coupled to a generator; thus, each generating set forms a three bearing, coupled type unit. The third turbine is of the double discharge, two bearing type, direct coupled to an alternator.

A 12 ft. diameter riveted steel pipeline about 550 ft. in length, conveys water to the power house; the latter is designed for housing additional generating capacity. Owing to the variable water head conditions prevailing, the turbines were designed to afford as flat an efficiency curve as possible, over a range of heads from 106 ft. to 143 ft.; the speed of rotation being constant to suit the 60 cycle periodicity of the system.

Each of the single discharge turbines are of nominally 2100 h.p., 225 r.p.m., but under the maximum head conditions developed an output of approximately 3400 h.p. The double discharge turbine was designed to develop 3200 h.p. under minimum head conditions, and 4500 h.p. at 360 r.p.m. under maximum head. In order that the pressure fluctuations in the 12 ft. diameter penstock could be limited to a



Interior of the present power house, showing the three Pelton reaction turbines direct connected to alternating current generators

predetermined amount, each of the spiral encased turbines was provided with a special governor actuated relief valve, having a slow closing feature. Thus, with a rejection of a large amount of power, the governor, in readjusting the position of the turbine wicket gates, would open the relief valve; the latter remained in a discharging position for that period of time only, as is necessary to prevent pressure waves occurring, after which each relief valve automatically and slowly closed to effect water economy. The time of closure is adjustable, and is controlled by means of an oil dashpot, interposed between the relief valve proper and the governor.

Under certain conditions of operation, it is essential that the relief valves act as synchronous bypasses, opening and closing inversely to the movement of the turbine wicket gates. An adjustment is provided whereby this result is accomplished.

The combined discharging capacity of the three relief valves is in excess of 465 sec. ft., under approximately 106 ft. head. At a future date, especially when the additional generating capacity is installed, it is expected that the operating characteristics of the plant will be such that the load fluctuations will be more severe than under the present conditions; accordingly, provision has been made in the design of the couplings, whereby heavy flywheels may be introduced without changing the setting of the generator or turbines.

A distance piece 4 in. in thickness is now interposed between the coupling valves, and by removing this, together with the shaft of either the generator or turbine, the flywheel may be bolted in place, involving the minimum shut-down.

The Business Library

BY LOUISE B. KRAUSE

(Technical magazines are the best source of up-to-date data in your field—are you making the best use of them? Methods of selection, of indexing and filing so that the magazine may be of the greatest use to the greatest number in the organization are here suggested. This is the fourth in a series of articles on the Business Library being written for the Journal of Electricity by the librarian of H. M. Byllesby & Company, Chicago. Attention is called to the copyright and the necessity for obtaining permission before reproduction.—The Editor.)

PERIODICALS IN THE BUSINESS LIBRARY—HOW TO USE AND HOW TO FILE THEM

The Value of Periodicals

Periodicals are the most fruitful source of information for any business, and there is periodical literature of value being issued constantly on every conceivable subject. Every industry and profession has its journals and in them will be found the latest and best information.

The value of periodicals in a business organization was very ably stated some time ago by the secretary of an electrical association, and as this testimony is not from a librarian but from a practical business man, it seems worth while to quote as follows:

Check cards on periodicals which enable the librarian to know if all copies to date have been received. On the back is noted the date of renewal of the subscription.

"The technical or trade journal of today is the livest and most 'up-to-now' assistant a business man has. It is carefully edited, well-printed, fully illustrated and thoroughly indexed both as to literary matter and advertisements. It is the 'always ready reference' of the minute, and the official, head of a department, or even workman, who does not use it to its fullest capacity, is neglecting one of his best friends. I have been surprised to find how many of the larger companies are actually stingy when it comes to paying out money for subscriptions to their trade and technical journals. They talk about one, two or three dollars per year as if it were that many hundreds; they look at the expenditure as if it were an expense instead of an investment, which, properly handled, will bring good returns.

"In no other way can any business man, no matter how high or low his position, keep so fully abreast of the times in his business as by early and careful perusal of his trade and technical periodical, from its front to its back cover, and from no other source can he obtain the 'immediately useful' so well as he can from a well filled and indexed present volume of those same publications."

"Printer's Ink" has also stated the case as follows:

"The manufacturer, desirous of keeping his finger on the pulse at Washington, who will spend ten dollars, or fifteen dollars, or twenty dollars a year for business papers and other periodicals that specialize with respect to business news from the national capital, can be pretty well assured that he has every tip that could come to him via the intelligence office, that asks a fee of fifty or one hundred dollars per annum. Indeed, it has happened, not once but dozens of times this past year or two that business journals, etc., carried information days and even weeks before it was sent out in the mimeographed 'letters' and 'bulletins' which the former bureaus distributed, marked 'confidential' and 'not for publication.'"

The Contents of Periodicals

Not only do periodicals contain lengthy articles on special subjects, but every item in them from cover to cover is of value; for example, in engineering periodicals the business library is greatly aided by the current news notes on books, pamphlets, meetings and people; information on state and federal legislation; prices of materials and second-hand material for sale or wanted to purchase, new construction notes, new devices and best makes of standard supplies.

The brief notes found in current periodicals, announcing the publication of trade pamphlets, reports of state boards, special committees, private corporations and bulletins published by universities, lectures delivered at colleges and papers presented at state meetings of associations, are most valuable guides in collecting pamphlets, which although in many cases may be had for the asking, represent a collection of valuable data which can not be replaced by the expenditure of any amount of money and yet most of it costs only a polite letter of request.

Aids in Selection of Periodicals

The business man or the business librarian will first of all desire to select the periodicals that best cover the needs of his organization. If he wishes to ascertain the titles of periodicals on special subjects in order to obtain sample copies for examination, or if he has the title and wishes to find the frequency of issue, the place of publication and subscription price, there are several books that give such information and which should be found in the public library of his city. It is advisable also for him to see a list of all periodicals which are on file at his public library with a view to examining those which may be suited to his immediate needs. The following books will give information about periodicals on special subjects.

Ayer & Sons' American Newspaper Annual Directory, published by N. W. Ayer, Philadelphia, $5.00.

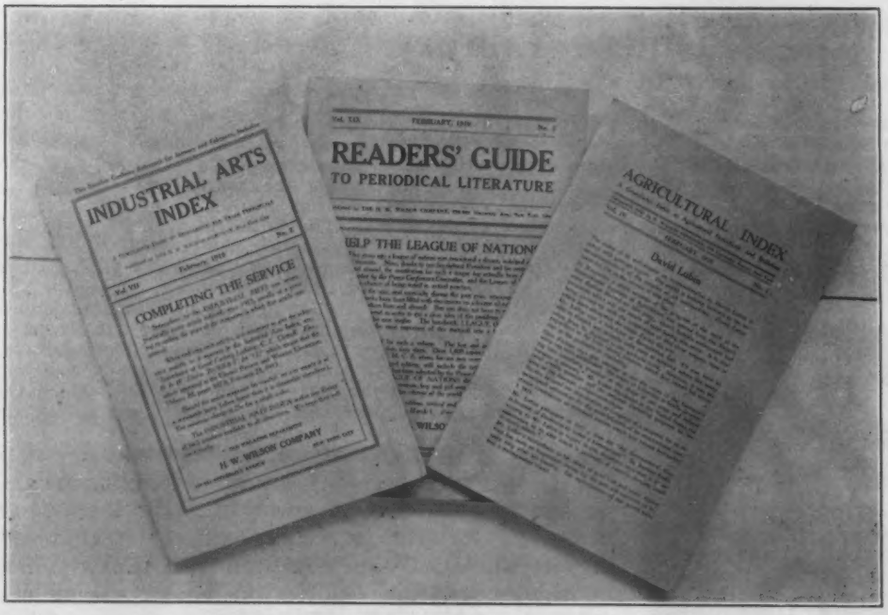
1600 Business Books, published by H. W. Wilson Company, New York, 1917, price $1.50.

Severance Guide to the Current Periodicals and Serials in the United States and Canada. A new edition will be published shortly by George Wahr, Ann Arbor, Michigan, price $5.00. This new edition will contain a list of House Organs published in the United States. A recent list of House Organs may be found in Printer's Ink, August 29, 1918, and subsequent issues.

A list of periodicals published by the United States Government can be obtained free of charge from Superintendent of Documents, Washington, D. C.

The Checking of Periodicals

The care of periodicals is one of the important pieces of work which consumes a large portion of the



These indexes of periodicals which are published by H. W. Wilson Company are of the greatest use to the business library — but should be supplemented by a subject index within the library itself which will have special reference to the company's interests and will cover items of importance too short to be listed in the published records. When unforeseen requests arise, however, the printed index performs an invaluable service.

business librarian's time. All periodicals received by the business library are stamped, as soon as the mail is opened, with the word "Library" and the name of the firm, and checked on monthly or weekly card records, size 3 by 5 inches, specially ruled for the purpose and obtainable from library supply firms. This card record enables the librarian to know if all copies to date have been received and on the back of the card also provides a record of expirations and renewals of subscriptions.

The Indexing of Periodicals

After the periodicals are checked, the librarian should go through them rapidly, keeping well in mind all the topics of particular interest to the organization, and also special requests from individuals for the latest information on subjects, which they have designated as being of present value to them. It is a good plan also to ask heads of departments who read periodicals regularly every week, to call the attention of the librarian to any special articles which they think valuable and to which they might wish to refer again. This strengthens the librarian's reading and makes doubly sure that no information of importance is overlooked.

All articles or items of importance are assigned a subject heading (which will be discussed in the article on cataloging), and a card is made for the subject card index to periodical material.

Some one may ask at this point why it is necessary for the librarian to do subject indexing to periodical articles when there are good printed indexes to them, such as Readers' Guide to Periodical Literature, Industrial Arts Index, and the Agricultural Index, published by H. W. Wilson Company, New York City (samples and prices upon application) and in addition The Engineering Index, recently acquired by the American Society of Mechanical Engineers and published monthly in the Journal of that Society. There are several reasons why subject indexing must be done by the librarian; first because these printed indexes do not index many of the periodicals which are of importance to the business library and second, because in the periodicals which are covered by these indexes, there are many items of importance to business firms which are too short to be entered in the general printed indexes. The time element is also an important factor in the business library, as the subject card index is made at once and immediately ready for reference, while the printed indexes are of necessity never strictly up to date. For example, an engineering firm was desirous of keeping up to date on all increases in gas and electric rates throughout the country, due to the increased cost of production, on account of higher prices of materials. Various journals reported such items each week, sometimes in not more than a dozen lines. In such a case the librarian's minute reading and quick indexing was invaluable, and gave a service not to be expected of the printed index.

A word should be said, however, at this point in regard to the value of printed indexes, for example the "Industrial Arts Index." Periodicals are sealed books without indexes, and printed indexes are invaluable working tools, first, because no business librarian will attempt the impossible task of making a subject card for every article of value in current periodicals, and second, because a live business organization in these days of sudden changes in economic conditions cannot possibly foresee every subject in which it may be interested. When these unexpected subjects arise for which the business librarian has not made provision, the printed indexes come to the rescue and serve the need most admirably. The indexes to separate volumes of individual periodicals, which the publishers issue at the completion of each volume, and in many cases do not send unless requested to do so, are not of great value because, with few exceptions, the subject indexing is poor. Many of them invert the title of the article in order to enter it under the most striking word which it contains, without consideration of its real subject content, and without further consideration of the three, four or more subjects on which the article is very likely to contain valuable information.

Coronado Conventions

(The Coronado Joint Conventions in retrospect appear as the most successful in the history of the Pacific Coast Section, not merely in point of numbers attending but also as to ideals realized and plans made for future endeavors. That this notable gathering set such a high mark is largely due to the efforts of the Section officers and the general convention committee with its various sub-committees, to whom too much credit cannot be given.—The Editor.)

The third annual convention of the Pacific Coast Section N. E. L. A. was the largest and most representative yet held. Convening at the same time and place as the jobbers and contractor-dealers associations, it had the advantage of their numbers in swelling the total registration above the five hundred mark and of bringing to its counsels their advice and experience. Furthermore, representatives of many eastern manufacturers were present, as well as the officials and department heads of central stations throughout the West.

Though President W. F. Wells of the National Association telegraphed his regrets at his inability to be present, the national body was ably represented by Vice-President R. H. Ballard and R. S. J. McClelland, chairman of the hydro-electric and engineering section.

"THE MAN IN THE STREET"

Aside from the discussions of the engineering and commercial papers printed elsewhere in this issue and the report of the Public Policy Committee, the outstanding feature of the convention was S. M. Kennedy's paper, "The Man in the Street," as printed in the May 1st issue of the Journal of Electricity. In the words of John A. Britton, it pointed out that "the public has a right which has to be recognized." "We should take ourselves from the pedestal of a public utility to the level of a merchandizer trying to sell his services."

In his discussion of the paper R. H. Ballard stated that public good-will is based upon public respect, which may be gained by following the lines indicated by Mr. Kennedy. He cited the service given by express companies and the attitude of their employes under federal operation as typical of what might occur in the central station field under municipal ownership. Whatever it may cost the power companies to bring public realization of these facts and of the benefits of private operation would, in his opinion, be money well spent and would ultimately be reflected in the net result of the operating report.

A. E. Wishon, in discussing the paper, emphasized the value of well-appearing properties and equipment in facilitating bond sales among consumers, whom he considers as most desirable investors. T. E. Bibbins laid stress upon the benefits resulting from personal contact of managers with the employes and the public. He also assured the support of the trade in aiding the power companies in their efforts to develop favorable public consideration of the power companies. Ed. Whaley explained how the substitution of "can't" for "won't," with explanation of the reasons why, had invariably led to better satisfied customers.

THE GOODWIN PLAN

W. L. Goodwin addressed a general meeting on Friday afternoon with regard to the betterment of the entire electrical industry that may be accomplished through the Goodwin plan.

VISIT TO AVIATION FIELD

On Friday morning the electrical men and their wives were the guests of Col. H. H. Arnold, commanding officer at Rockwell Aviation Field, North Island, the trip from the Hotel del Coronado being made in autos. The visitors were taken through the shops and hangars and given a demonstration of wireless telephoning to and from airplanes. An aerial circus was staged by a number of the aviators who performed many spectacular evolutions.

Many of the guests also accepted the invitation of Lieutenant R. T. Strong to inspect the U. S. S. Marblehead on Sunday.

ENTERTAINMENT FEATURES

The beautiful environs of San Diego lent themselves admirably to the entertainment of the ladies and other guests by means of automobile rides during the daylight hours. Through the courtesy of the moving picture producers interesting films were shown on Wednesday evening, the association also being favored by dancers from the Liberty Theatre at Camp Kearney. Dancing was enjoyed each evening throughout the convention period.

Outdoor sports of all kinds were provided for those so inclined. Handsome prizes were awarded the winners in various tennis, golf, swimming and bowling contests.

THE BANQUET

The climax of the convention was reached at the banquet on Friday evening, and too much credit cannot be given the committee having this affair in hand. The main event of the evening was the address by E. O. Edgerton, President of the California Railroad Commission, who urged the public utility men of the state to do their best to prove the case of private ownership as against public ownership, expressing meanwhile the belief that the men of California's public utility corporations were of such caliber as to make that case good. His address will be printed in full in these columns in an early issue.

Mr. William C. Clayton, vice-president and director of the Spreckels' interests, was toastmaster. The banquet opened with the singing of "America" and a toast to the President of the United States.

The main dining room of the hotel was beautifully decorated for the occasion with the flags of all nations and elaborate electrical effects were installed, including a complete wireless station from which humorous messages were flashed during the progress of the dinner.

One of the most amusing skits of the evening was the "Passing of the Spirits," which proved to be the burial of John Barleycorn. A huge papier mache bottle formed the bier of the lamented John. This was borne into the banquet room by somber-clad pall bearers, preceded by a Puritan-like funeral director impersonated by Secretary A. H. Halloran, who delivered a funeral oration cleverly parodying Shakespearean stanzas. At this stage of the proceedings a wireless message was flashed that President Wilson had rescinded the order for prohibition, which was the signal for the cork to pop and liberate colored balloons and confetti, John Barleycorn coming to life from the interior of the bottle and delivering Eugene Field's "A Cold Bottle and a Bird," B. T. Robley taking the part. The wireless also brought forth from beneath the bier a number of ballet dancers who gave a bacchante dance until interrupted by a second wireless message that the President had not rescinded prohibition, whereupon John subsided into the bier bottle and the cortege mournfully made its exit to the strains of Chopin's "Funeral March."

During the course of the evening there were also songs by William Proctor, a demonstration of the powerful voice reproduction by the Magnavox, and community singing. The dinner was concluded by the band from the naval air station marching to the speaker's table and playing the "Star Spangled Banner."

BUSINESS SESSIONS

The opening session of the convention was marked by the introductory addresses and routine business.

President Samuel H. Kahn reviewed the work of the year and made important recommendations for the coming year. Reports of the Secretary and Treasurer then followed reviewing the state of the society—and reports from the various standing committees.

The membership committee reported that the association had held its own during the past year. Comparative membership figures are given as follows:

Class of Membership	April 1918	April 1919	Decrease	Increase
A	41	33	8	
B	529	534		5
C	5	5		
D	54	20	34	
E	71	84		13
	700	676	42	18

Reports and recommendations were made by the Engineering and Commercial Committees and the Committee on Cooperation. This was supplemented by a brief report from the Advisory Committee of the California Electrical Cooperative Campaign which gave a brief review of the accomplishments of the past year and plans ahead.

The Publicity Committee, in a report presented by Ed. Whaley, briefly outlined their plan for the establishment of a clearing house of public relations under the Public Policy Committee. The Executive Committee did not feel warranted in December, 1918, in authorizing the further prosecution of the work as planned and it was proposed to bring the matter up at this convention. The executive committee, however, arranged with A. H. Halloran to prepare a series of fourteen "Public Service Talks." The Publicity Committee recommended that the necessary steps be taken to carry out this plan in full.

The Public Policy report presented by John A. Britton was presented on the last day of convention proper and is given in full elsewhere in this issue.

Among the resolutions passed by the convention was one recommending the study of the subject of railway electrification by the Engineering Committee with a view to the conservation of fuel oil. The question of national committee appointments was further considered and recommendation made that the chairmen of the National Engineering Committees make their appointment of committees relative to the Pacific Coast Section after considering the recommendations of the chairman of the Engineering Committee of this section.

Disapproval was expressed of the proposed establishment of a standard of ethics by the Bureau of Standards at Washington as in some measure overlapping the province of the railroad and utility commissions.

The discontinuance of the use of lighting sockets for electric appliances and the instigation of a campaign educating the public to the evils of this use was unanimously urged. The establishment of a Bureau of Public Relations under the direction of the Public Policy Committee was also determined upon.

Felicitations to the North, an expression of confidence in the California Electrical Cooperative Campaign, an extension of the spirit of cooperation to Pacific neighbors and thanks to hosts were the subjects of further resolutions.

The following resolution of thanks was tendered the Journal of Electricity:

Whereas, The Pacific Coast Section N. E. L. A. in convention assembled desires at this time to extend to the Journal of Electricity its full appreciation, not only for the very great support that publication has given the Section at all times, but more particularly so at this time, first in the publication of the special issue of the Journal containing the papers which have been presented and the forwarding of a copy of such issue to all members of the Section, and which action has not only enabled us to conduct our meeting in a more expeditious manner, but also has made it possible for the discussion of the several papers to be more to the point than it would have been had not the papers been printed in advance; also for the further spirit of cooperation in the publication and distribution of the Service issue containing matters of interest to those in attendance upon the convention;

Therefore Be It Resolved, That it is the sense of this convention that a vote of thanks be extended to the Journal of Electricity for the material help which it has been to our Section, and more particularly to the upbuilding of our industry as a whole in the West.

The newly elected officers for the coming year are:

President—A. E. Wishon, San Joaquin Light & Power Corporation.

Vice-President—E. R. Davis, Southern California Edison Company.

Vice-President—Lee H. Newbert, Pacific Gas & Electric Co.

Secretary—A. H. Halloran, Journal of Electricity.

Treasurer—J. F. Pollard, Sierra & San Francisco Power Co.

EXECUTIVE COMMITTEE

Arizona—R. S. Masson, Pacific Gas & Electric Company, Phoenix; Arizona Power Company, Prescott.

Nevada—Geo. A. Campbell, Truckee River General Electric Company.

New Mexico—C. M. Einhart, Roswell Gas & Electric Co.

Jobbers—C. C. Hillis, Electric Appliance Company.

Contractor-Dealers—Frank Somers, Century Electric Co.

Manufacturers—E. O. Shreve, General Electric Co.

Central Stations—Wm. Baurhyte, Los Angeles Gas & Electric Corp., Los Angeles; Henry Bostwick, Pacific Gas & Electric Co., San Francisco; S. M. Kennedy, Southern California Edison Co., Los Angeles; A. B. West, Southern Sierras Power Co., Riverside; Samuel Kahn, Western States Gas & Electric Co., Stockton; J. B. Black, Great Western Power Company.

THE PRESIDENT'S ADDRESS

President Samuel H. Kahn, during the course of his introductory address, presented the following survey:

The outlook of the Pacific Coast Section of the National Electric Light Association at the close of its Second Annual Convention in May, 1918, did not seem promising as all of us were absorbed—some to a greater extent than others—in the common work of cheerfully performing a service for our country, that needs no elaboration on my part. An active, keen interest in the Association affairs could but indifferently command our attention. Since the middle of November, 1918, however, Association work was given the notice that under ordinary circumstances it would have merited had world conditions been normal and even though the time from then until now has been relatively short, not a little has been accomplished, due to the earnest efforts of your Executive Committee and various Committee men. Such work as has been initiated by the Commercial Committee, Engineering Committee, Publicity Committee and other committees should receive the profound consideration of the ensuing administration and it is hoped that it will enlarge, amplify and expand upon the measures inaugurated.

The Financial Situation —

The financing of the Association is one which has commanded considerable attention during the past year and one which deserves serious thought in the future. At the present time the Pacific Coast Section receives as a refund from the parent organization of the National Electric Light Association one-half of the fixed or stated dues and none of the percentage dues. It is estimated that the refund from the NationalAssociation this year will be approximately two-thirds of our budget and while we have ample funds to provide for the 1919 expenses, an apparent deficit must be faced by the end of 1920 unless the National Association remodels its plan of financing its Geographic Sections without increasing the present rate of dues paid by members of its Geographic Sections. Undoubtedly all of us are in favor of National organization so long as National organization cooperates with us to the extent of permitting us to exist on a healthy basis. If, however, the National Association limits our finances to a point where we are unduly curtailed in the performance of the duties and investigations incident to the

successful maintenance of such an important Geographic Division as ours, we must then devise ways and means to modify this condition. None of us are anxious to take initiatory steps that would even partially disturb our present relations with respect to the National Association, yet a different form of organization is foreseen unless we are given the recognition and assistance that we believe we merit.

Decrease in Membership —

The membership of the Association has decreased to an alarming degree, this statement being generally true with respect to all classes of members with the exception of Class E. Upon comparing the membership of the several classes at the present time with the membership in 1917, we find that Class A members show a decrease of 35 per cent, due to consolidations, and consequently this decrease is more apparent than real; Class B members a decrease of 57 per cent; Class C members—no change, that is no increase or decrease; Class D members a decrease of 41 per cent, and Class E members alone show an increase of 30 per cent. The combined membership shows a decrease of 52 per cent. The reason for the greater part of decrease in membership of Class B is readily understood, and in fact is complimentary to the manhood of the Association for it indicates the goodly number of our members that enlisted in the country's cause. The decrease in Class D members is likewise understood, for many of this class put their business aside and entered the ranks. It is hoped and believed that these two classes of members will return to the fold. Generally speaking, however, the Association work must be made more attractive to Class B and Class E members, for the greater number of this membership are not afforded the opportunity of attending conventions and participating in convention work and we must, therefore, devise ways and means to hold their respect and interest if we expect this membership to show material increase. You will observe that the comparison of membership of the present time has been made with that of 1917—two years ago, so in justice to the Association and its membership committee, I am pleased to announce that the membership of 1919 as compared with 1918 is found to be approximately the same.

Program of Water Power Development —

The Pacific Coast is blessed with an abundance of water that might be used for the generation of hydroelectric energy provided Congress enacts laws that would encourage and foster work of such constructive nature. Continued propoganda for the education of the public should be the order of the day and the Publicity Committee should exert unceasing effort to let the people of the Pacific Coast know of its handicap due to the shortage and consequent high price of fuel, coupled with the difficulty incident to putting to beneficial use the tumbling waters of wild mountain streams now running to waste. The Pacific Coast cannot come into its own as a manufacturing district until we have more cheap power to distribute and the demand at the present time is even more insistent than it was five years ago, for within that length of time many new uses for electricity as a substitute for fuel have become common and when such substitution takes place it usually requires large blocks of power. This is notably true with the electric furnace for the production of steel castings. Not so long ago a statistician compiled figures to indicate that the number of kilowatt hours sold increases more rapidly than the square of the population; in other words, if the population is doubled, the energy consumption is more than quadrupled; therefore, if the population of the Pacific Coast doubles within the next ten years, the use of electricity will be four or five times as much as at present. Figures recently published by the Bureau of Census, Department of Commerce, indicate that the Central Stations of California during the year 1917 generated 2,746,000,000 kilowatt hours of electric energy as against 661,000,000 kilowatt hours in 1907, an increase of 315 per cent, whereas the population of California increased during that ten years less than 60 per cent. These figures bear out the statement regarding the consumption of electrical energy and should be instilled in the minds of every thinking man and woman. They must come to realize that the solution and responsibility of furnishing this energy rests with men trained to that particular industry, as these are in a position to render that service, taking all factors into consideration, at less cost than a governmental agency. Here also the Publicity Committee has a fertile field within which to work, for it must teach the people that a most important task may be properly delegated so that they may enjoy all of the benefits that would accrue to them under municipal ownership without the attendant evils of municipal ownership. Supplementing such educational work, member companies of the Association can further strengthen their position by the popular sale of securities such as preferred stocks to the people whom they serve. Some of the companies have already done this and it is to be hoped that other companies will be able to do likewise when the opportunity presents itself. We must bear in mind that this is an era of reconstruction in its broadest terms, and the people are thinking along different lines. The time to mold public opinion is now, and if teaching the people that their problems are ours and that in the last analysis our burdens are theirs, we will continue to administer a public trust that from a social and economic standpoint can best be directed in private ownership. The Publicity Committee has outlined an extensive program that was given the approval of the Public Policy Committee and Executive Committee, and the initial work has been started.

Electrification of Railroads —

The ever broadening market for electrical energy presents some unique and complicated problems involving standardization of apparatus and system. One of the most important uses of energy that has passed the experimental stage and now promises to come into practice is that of electrification of steam railroads. This measure which has received the attention of our Engineering Committee in a preliminary way must be given persistently our best thought, as it is one of the most important measures that this committee has before it. Other work, however, of equal importance is the system of inter-company connections, as I believe that the time is not far distant when a bus bar, so to speak, will extend from Northern to Southern California. In Northern and Central California, during the summer and fall of 1918, inter-company connections proved their effectiveness in partially relieving the serious situation caused by shortage of hydroelectric power due to small precipitation in the high Sierras during the 1918-1919 season.

The Question of Rates —

In passing I want to remark that the Public Utility Commissions of the Pacific Coast, and particularly California, performed a signal service during the past twelve months in raising the rates chargeable to the public by central stations and in taking such action they performed meritorious service not only to central stations but to the public as well, for the slight increase in rates permitted the public utility companies to continue to render their high standard of service and to make extensions and improvements which the increase due to ordinary growth required and the increase due to war conditions demanded. It is refreshing to observe that the public made comparatively little or no protest to the action of the Commission in raising rates, which in itself is a wonderful tribute to the Commission, for the people had come to realize that the Commission was worthy of their confidence and that if the rates were raised they were done so in justice and equity to all concerned. While some of us in the past may

have chafed at times under Commission regulation it is to be hoped that this regulation in competent hands, such as we have enjoyed in California, will be with us for all time to come and that if any change is made in the Public Utilities Act, under which the Commission operates, it will be a change that will broaden the Commission's powers instead of curtailing them, including among other things Commission regulation of municipally operated public utilities.

Cooperation —

The four branches of the electrical industry, namely, the

Manufacturer
Jobber
Contractor-Dealer
Central Station

have worked closer together than ever before and the spirit of cooperation manifested is worthy of special mention. Each branch has come to realize that it can accomplish most for itself by lending its support to strengthen the other branches of the industry. It is to be hoped that this realization will continue to grow and expand in geometric progression. In its inception the National Electric Light Association was an organization for the Central Station exclusively, and without reviewing its evolution and growth to an Association of the present proportions and purposes it may be stated irrefutably that the expansion of its activities and aspirations has contributed to its usefulness and strength. Furthermore, I am firmly convinced that no part or section of the National Electric Light Association comprehends and realizes better than the Pacific Coast Section the beneficial results of such broader policies. I hope that unceasing effort will be exercised, especially by the Committee on Cooperation, to bring about an even more binding and closer affiliation between the four branches of the industry than exists at the present time.

War Service —

I cannot conclude without paying tribute to the splendid part that the men of the electric industry played in the winning of the war, and while greatest praise is due to the men who went to the front, it must not be forgotten that those who stayed at home performed a service that was more prosaic but entirely necessary. However, to the men that donned the uniform belongs all the glory and our patriotic spiritually. Therefore, in so far as we can, even to the ultimate straining point, we must provide position for such of our straining point, we must provide positions for such of our boys that return and desire to re-establish themselves with us, even though they come back in disabled condition. This may involve some temporary sacrifice on our part but the sacrifice can be no greater than that of the men who left family, home and means of livelihood to uphold the honor and dignity of our country.

REPORT OF SECRETARY

A. H. Halloran, as secretary, reported as follows:

This third annual convention of the Pacific Coast Section N. E. L. A. marks the rounding out of two years and a half of well directed effort toward improving electrical conditions in this section of the country. For, contrary to common opinion, a convention is but an incident in the life of an association; a time for taking stock of past accomplishments and arranging future endeavor. Throughout the entire year the officers and committees are continually at work along lines whose results become manifest at the annual meeting.

From its very inception, the Pacific Coast Section has been a leader along untrodden paths. Its initial plan of organization, whereby the manufacturer, the jobber and the contractor-dealer have a voice in its councils, is being adopted by other geographic sections which heretofore laid undue emphasis upon the central station membership. Through the efforts of its first Commercial Committee, a sound merchandising campaign is being actively prosecuted under the direction of the California Electrical Cooperative Campaign Committee. Its Engineering Committee has been foremost in advocating standardization, and in formulating codes for the use of regulatory bodies, and recently the Publicity Committee has laid the groundwork for a popular educational campaign which should do much to improve public relations.

This last movement is the direct outgrowth of the Del Monte Convention, when the Public Policy Committee recommended the establishment of a Publicity Bureau. The first step to this end was the appointment of a Publicity Committee, which has done much work of a preparatory nature, but most of whose suggestions could not be carried out because of a lack of funds. It is anticipated that definite means will be taken at this meeting to bring about the creation of an informed public opinion regarding the electric utilities.

The financing of the Section during the past year was materially aided by an appropriation of $2,000 from the National Association. By this means it has been possible to refund one-half of the $1,500 advanced by the California companies to put the Association on its feet at the start, and also to have some money available for publicity means. Our request for a refund of one-half the percentage dues paid by Class A members, and a greater localization of effort, has been referred to a special committee which will meet at Atlantic City on May 19th of this year.

During the past year the Engineering Committee started two innovations, whose need was removed with the end of the war, and which were consequently discontinued; one being the establishment of a Salvage Bureau, and the other an interchange of expert personnel—the one a clearing house of equipment, the other a clearing house of men. If the war had continued, each might have been an effective means for facilitating the giving of good service. The Committee has gone on record as strongly in favor of standardization of equipment to care for prospective railway electrification, and has also submitted a code for overhead line construction to the California Railroad Commission. Because of Professor Ryan's absence from Stanford University, there was a suspension of insulator investigations. Since peace has come, the Engineering Committee has directed its energies to the preparation of the excellent program of papers to be presented at this convention.

The energies of the Commercial Committee members have been closely associated with the California Cooperative Electrical Campaign, which has brought about concerted appliance sales effort on the part of the jobber, dealer, and central station, incidentally promoting a better feeling between these two branches of industry and accomplishing much good by an extended appliance advertising campaign. These excellent inter-industry relations are reflected in the fact that this Coronado meeting is held during the same week and at the same place as the Jobbers and Contractor-Dealers' meetings.

The Membership Committee has made an excellent showing, having secured a total of 254 new members, and if it had not been for the abnormal conditions due to the war, this record would undoubtedly have been exceeded. Particular mention should be made of the work of J. M. Buswell, of the San Joaquin Light and Power Corporation, and of J. W. Burns, of the Southern California Edison Company, the latter securing 329 Class B members from his company, this representing considerably more than one-half the Class B members of the Association. Two suggestions which have helped to stimulate member interest during the past year have been the mid-year dinners given under the auspices of, or with the cooperation of the Section at San Francisco and Los Angeles, and the publication of the "Electrifier," which advises members of Section doings. Some effort has been made to bring about a closer affiliation with the electrical leagues

in several cities throughout the Section, and it would seem desirable that such affiliation be accomplished during the year to come.

Our membership of today is as follows:

Class A	33
Class B	534
Class C	5
Class D	20
Class E	84
Total	676

Of last year's total membership of 700, 276 do not appear on our list, due to deaths, resignations and non-payment of dues. As many have neglected to pay their dues merely through an oversight which will be corrected before the end of the year, it is safe to say that we will again reach the 700 mark before the end of the year.

That the Association has so successfully weathered the storms of 1918 augurs well for its future prosperity. The plans for such activities as might be undertaken have been so well outlined in President Kahn's address as to require no amplification here. At this time I cannot forbear from expressing my appreciation of the kindly spirit and the cooperation accorded me by all officers and members in the Association. The officers do not make an association such as ours, but in the words of Kipling, it is "the everlasting teamwork of every blooming soul."

Report of Public Policy Committee

JOHN A. BRITTON, Chairman

(The courage to resume business with confidence in the face of uncertainties is the message of this report to the industry. The carrying on of the inter-connection and inter-cooperation of power companies into peace conditions, more comprehensive plans for the education of the public as to the position of the public utility and the reemployment of returned soldiers are among the recommendations made.—The Public Policy Committee consists of John A. Britton, chairman, W. A. Brackenridge, A. G. Wishon, R. H. Ballard and Mortimer Fleishacker.—The Editor.)

If there ever was in the history of our industry a reason and an excuse for the presentation of the report of the Public Policy Committee, the events of the year 1918 present such reason and excuse, on account of the abnormal conditions which existed throughout the United States due to its conflict with the Central Powers and the necessity for the exercise of every effort human ingenuity could devise to bring the war to a speedy close.

Electrical Industry Helpful.—In this helpfulness of patriotism none more signally distinguished itself than did the electrical industry, for it may safely be said that without its help and the cooperation of every generating and distributing company in the United States the marvelous wonders accomplished by all the arms of the Government and in its Army and Navy service would never have been realized. That this was the united policy of the public utilities speaks volumes for their patriotism as during the greater period of the war, the utilities suffered severely from war conditions, while practically every other industry in the country benefited.

On the Pacific Coast, where new impetus was given to shipbuilding, manufacture of aeroplane motors, and in the intensity of agricultural production, the elements of electricity entering into the success of these war measures astounded the balance of the United States. Many dormant industries were awakened to new life. California found itself, by the researches of the Government and its agencies, possessed of minerals entering into the manufacture of munitions that had heretofore lain dormant, and not only to the nation, but to the Pacific Coast states was added a wealth, not alone of money, but of knowledge, that nothing but the crucial test of war could have so thoroughly developed.

Interconnection of Systems.—At the outset of this report your Committee desires to extend its commendations to the Railroad Commission of the State of California, and to the several public utilities of the state, for the particularly active, energetic and resourceful endeavors which they made to bring about the most economical utilization of the generating plants of all of the public utilities of this state, not only hydro-electric but steam as well, and to the credit of these companies be it said that they acted under direction of the Railroad Commission as a unit.

In the progress of the investigation of the question of interconnection of the several companies in the state by the Commission and Government officials—Major Geo. F. Sever of the War Industries Board, and Mr. D. M. Folsom of the Fuel Administration—it was developed that the need of additional hydroelectric energy was painfully apparent. While this had been known to the operating companies of the state, and while every endeavor humanly possible had been made to have Congress pass such legislation as would relieve the shortage, nothing had been accomplished, the last Congress adjourning while just on the eve of passing a bill that, while not fitting and meeting all conditions, was nevertheless

RAILWAY ELECTRIFICATION

Whereas, Public interest demands the conservation of crude petroleum for the derivation of distillates and lubricants and for use as a fuel only where other forms of power are not available, as in merchant and marine shipping, and more especially for the driving of our ships of war, and

Whereas, The greatest use of petroleum, from the California oil fields, for power generating purposes, is in railroad locomotives, this use amounting during 1918 to thirty (30) million barrels of the total production of over one hundred (100) million barrels, and

Whereas, The greatest conservation of petroleum, from the California fields, can be accomplished by the substitution of hydroelectric power for a portion of the steam power now produced by means of petroleum fuel, and

Whereas, Such substitution of hydroelectric, for steam power, will require a construction period of several years for the development of the substitute power, and

Whereas, the plans for the corporations now developing hydroelectric power, in and near the State of California, for future extensions of their existing developments, will be generally changed by the possibility of their being called upon to supply such a demand as that of the electrification of mountain railroad divisions;

Now Therefore Be It Resolved, That the Pacific Coast Section of the National Electric Light Association, assembled in convention at San Diego, California, this 2nd day of May, 1919, instructs its Engineering Committee to make a study of the subject of conservation of fuel oil by means of the electrical operation of railroad divisions, with the end that it may consult with and advise the technical committee of the National Association entitled the Steam Railroad Electrification Committee, concerning the peculiar needs and problems of this section; and

Be It Resolved, That the Engineering Committee of this Section be further instructed to cooperate with the committee appointed by the San Francisco Section of the American Institute of Electrical Engineers for the purpose of investigating this subject, provided such cooperation is agreeable to said Institute Section; and

Be It Further Resolved, That the Engineering Committee of this Section be also instructed to report to the Executive Committee such further action in this matter as it may be pleased to recommend.

of a nature that would have to some degree encouraged further development . The shortage of hydroelectric power was accentuated by the abnormally low rainfall in the years 1916-1917 and 1917-1918, which seriously curtailed the output of the hydroelectric plants, and the situation was rendered still more serious because at the time when the Government desired to conserve as much as possible the uses of fuel oil for war purposes, additional and increased amounts of fuel oil were essential for use in steam plants for the generation of power.

It has been estimated that the net results of interconnection existing and planned will conserve power amounting to over 100,000,000 kw-hr. per annum.

The diversity in the northern group was not so great as the southern group. In the northern part of the state each of the companies operated at 60 cycles and there was no particular difficulty experienced in operating the entire network as a unit. This was not true of the situation in Southern California.

The emergency of the war brought about a tie-in with the California-Oregon Power Company, which practically put in service the longest transmission in the world. It is interesting to note in this connection that there remain but four small gaps to complete a continuous tie-in over 2,000 miles in length, stretching from Harlowtown, Montana, through the Pacific Coast states and down to the border of Mexico; thus is very nearly realized the dream of electric engineers of the Pacific Coast that at some day a bus bar from Oregon to Mexico might be constructed from which would be fed each of the systems involved, and the only limitation on such a project today is in the question of the limited economical capacity voltage at which they may be operated.

Productive Resources.—We have formerly spoken of the intensity of production in the Pacific Coast states in agriculture. The war demonstrated that what is needed is more production, and what the industrial worker wants is opportunity to take part in the great business of the world, and the more we can expand our productiveness the greater will be his opportunity for work. The lands to be reclaimed from the flood waters of our rivers on the Coast, and the application of irrigation to semi-arid lands existing, multiply their food producing power and increase the productive possibilities of the country, and also tend to increase the demand upon our Central Stations and therefore urgently present again the question of more liberal terms by the Government in the occupancy of Government lands for the production of water power. Under the intensive electrification of lands, it is easily demonstrable that the Pacific Coast states alone, if they possessed the intensive cultivation of foreign countries, particularly of southern Italy, could produce foodstuffs sufficient to feed the entire United States.

Unrest in Industry.—Confronting the country at this time is a vague feeling of industrial unrest, very largely augmented by fear. Is not one of the first steps necessary to improve this situation for us all to pick up our courage and resume active work of expansion? Should our development work be held back because the cost of money, materials and labor is more now than under pre-war conditions? These are matters which upon the scientific basis of regulation in effect in California, should be, and we believe are, given consideration in the fixing of rates of public utilities by our State Railroad Commission. The principle of regulation is not to retard industry, but rather to encourage it. We need also the recognition of the fact that the dollar today has less purchasing power than it ever had—good policy dictates that to keep the utility in a healthy condition, it must have credit and that credit can only be maintained by its power to earn a return which will enable it at all times to meet its every obligation, provide a surplus for proper return to its stockholders, provide depreciation reserves and by so doing stimulate it to renewed efforts of economical administration.

Participation.—Has not the time come when the workers in our industries must have opportunity to participate in the increment of their own labor? Participation is said to be the antidote to anarchy. As a step in this direction, the granting of opportunity to employes to become stockholders has been found to be effective. Stock purchase plans usually permit the employe to subscribe for a substantial block of stock, as compared to his monthly wage, providing for payment on the basis of small monthly amounts saved from his wages and allowing an actual participation by crediting to his account dividends on the full amount of his subscription, at the same time charging his account with interest at a lower rate on deferred payments. The industrious worker of today does not hold to the old socialistic desire for a division of wealth. He knows pretty well that if all the wealth of the country were divided equally, the resultant amount to each individual would be only about $2,500 of invested capital, the interest upon which would be but a negligible annual amount. The principle of partnership and participation properly administered makes for loyalty, because down through the ranks to the last recruit,

BUREAU OF STANDARDS

Whereas, There is existent in the State of California and other commonwealths of the West, comprising the membership of the Pacific Coast Section, N. E. L. A., legally constituted bodies whose function it is to supervise the establishment of rates and the general efficiency with public service corporations serving the public, and

Whereas, Conditions west of the Rocky Mountains present new and unusual features in the development of our natural resources peculiar alone to this great section of our nation; and

Whereas, The aforesaid legally constituted regulating commissions enjoy the complete confidence of the utility companies and the public served in the performance of their duties;

Therefore Be It Resolved, That we, the members of Pacific Coast Section, N. E. L. A., in convention assembled at Coronado, do hereby express our disapproval of the proposed establishment of a standard of ethics by the Bureau of Standards at Washington purporting to outline methods of operation, the fixing of rates or any other matters that are today rightfully enjoyed by the aforesaid regulating commissions in the commonwealths of the West.

Furthermore Be It Resolved, That member companies of the Pacific Coast Section, N. E. L. A., be requested to write to each of their congressmen, sending them a copy of this resolution and requesting their influence in opposing any congressional appropriation for the activities proposed by the Bureau of Standards. And also that the National Electric Light Association be requested to adopt a similar resolution."

hope becomes the inspiration, fear does not exist to impair efficiency, the square deal is recognized as every man's due, and interwoven with every day's work is the purpose ahead. The worker knows that his superiors are his friends, his co-laborers are his partners and that within the organization is his present and his future.

Reward for Efficiency.—The public utility company, as well as its employes, should have opportunity to participate, if best results are to be obtained. The utility which through initiative research or design, or through wise, skillful and diligent management, has reached a point of such efficiency that it is enabled to improve its service to its consumers, to operate at a lower cost, and to more advantageously finance its requirements, should not be crowded into a position where it will be stripped of all the benefits of its performance, but rather should receive a recognition which would tend to put a premium on careful, economical and efficient operation. This would not only encourage capital but would hearten the employe by a recognition of his efforts. The regulating bodies must eventually recognize that the utility which is most successful is the one which can best serve the public.

Rates for Service.—Responding to applications of the public utility companies and to the suggestions of the President of the United States, the Secretary of the Treasury, and the Comtroller of the Currency and other government officials, that as a necessary aid to winning the war, public utilities must be kept in sound financial condition, the Railroad Commission of the State of California, has, during the past year, made numerous adjustments in rates for service, in the majority of cases by the addition of surcharges. This form of added rate was adopted to compensate for specified increased costs, in order that adjustments might be made from time to time if costs were reduced or increased, and in order that the whole amount of the increase might be readily eliminated when the cost of operation returned to the normal pre-war basis. The effect of the addition of the surcharges has been to permit some of our member companies to obtain additional funds by the sale of securities with which to proceed with necessary developments which have been delayed due to shortage of men and money as well as the cost of materials.

Future Conditions.—Since the help given by the Railroad Commission to the public utilities, conditions of operation have suffered little or no change; wages remain at war time prices, taxes have increased, and material and supplies of the character used by public utilities have not changed materially. The hope is ventured that the Commission may in readjustment of rates that will occur eliminate to a large extent the surcharge, which bears the impress of a war time measure and therefore, now that the war has ceased, ought to be eliminated, and make such adjustments of schedules of rates as will compensate the public utilities to the same degree and help to maintain their increased efficiency. After all, it may be broadly stated that the success of the public utilities means the success of the state in which they operate. The relation of capital and labor is so strong that one cannot be divorced from the other, and as the public utilities must recognize the reasonable demands of labor and must meet daily operating conditions by submitting to the laws of supply and demand on the question of materials, encouragement therefore in rate of return must be given so that they can be financed in the construction of the inevitable increases in its plants. It is only fair to say that most of the Railroad Commissions have been awake to the necessity for this action and have demonstrated it in the decisions rendered often against ignorant public opinion.

Education.—To accomplish a feeling of security among investors, not only must there be the Commission action but also the education of the masses, and the education particularly of organizations that are formed for the purpose of contesting at all times, in and out of season, the reasonable applications of the public utilities for consideration of their conditions. The public utilities are not sufficiently alive to the necessity for this education. They spend money freely in the extension of their lines and in the securing of new business, but they do not get to the vitals of their interests when they neglect by the means within their power the proper education of the people, and while there has been a change for the better in respect to this in the past few years, the field is still comparatively untouched. Advertising to a degree accomplishes it, but better still would be the personal contact by heads of public utilities with the public in explanation of their difficulties and problems; also the education of the employes of the utilities in such a way that they would be able to discuss with the consumers properly the trials and difficulties, as well as the aims and ambitions of the utilities. There should be in the public schools and universities of this state an education more extensive than at present given in relation to the public utilities and in the matter of motor-driven machinery, so that the consumers themselves would understand the general operation of systems and thus become more fully acquainted with what their demand upon the company means when reduced to a question of dollars and cents by the monthly bill.

In connection with this education of the masses

EXTENSION OF THE SPIRIT OF COOPERATION TO PACIFIC NEIGHBORS

Whereas, The Pacific Coast Section, N. E. L. A., is an organization that has fathered the industrial development of this section of our nation which has today reached a plane of activity nowhere else in the world even approached in electrical development per capita of population, and

Whereas, We recognize that this has largely been brought about through a spirit of cooperation of all those engaged in this work on the basis that "He profits most who serves best," and

Whereas, We recognize that the recent world conflict was largely due to the grasping characteristics of the Central Powers in defiance of this great fundamental law of ethics,

Therefore Be It Resolved, That it be the sense of this meeting that this selfsame spirit of cooperative helpfulness should be broadened and extended as rapidly as possible so that our increasing commercial and engineering relations with countries bordering the Pacific ocean may be built upon substantial foundations, free from the spirit of domination or grasp and more properly built upon the basis of sensing the need for service and that the supplying of that service at a profit is legitimate and ethical provided all parties in the exchange are benefited thereby.

encouragement should be given the educational service of both the National Electric Light Association and the University of California Extension, as recommended by the California Electrical Cooperative Campaign.

Aside from the question of participation in the public utility by the employes thereof, there should be engendered very largely among the employes the feeling that the corporation is alive to the personal interests of the employes, in addition to their investment in its properties and participation in its profits. If this interest is displayed, by such consideration as one human being will give to another, it will help to break down a lot of the prejudices that exist, because an employe dissatisfied is spreading an unrest more effective against corporations than the utterances of those who preach the general proposition that "All corporations are soulless."

Re-employment.—Your Committee recommends, as a matter of policy to be adopted by all of the members of the Association, the re-employment of all employes who are inducted into the service of the United States, either by draft or by voluntary enlistment. In recognition of what these men have done in the service of their country, their old positions should as far as possible be given to them. If such positions have been abolished, they should at least be offered a position of equal importance. It is reasonable to suppose that the temperament of the men, by reason of their service, has been somewhat changed, and due allowance for this should be made, and while the Committee recognizes the necessity for the economical administration of every organization, the ambitions of men held responsible for economies should not be permitted to interfere with the proper restoration of the men.

The Future Considered.—The possibilities electrically on the Pacific Coast are boundless, not only in the productivity of electricity but in its extended use. There is no part of the world where its use is more general or more diversified. It is not an unusual thing to find in the homes of the farmers all of the conveniences that go with electrical development, from the electric range in the kitchen to the motor that supplies the water for irrigation of the farm. The average rate per kilowatt hour at which energy is sold upon the Pacific Coast is less than that of any other section of the United States. This is partly due to hydroelectric developments and also to the greater diversity of use, and as soon as there is a relaxation by the Government of its drastic rules governing possession of public lands, so soon will arrive a lower rate for the benefit of the communities which we serve.

The help of the regulatory bodies in all the public land states is needed to impress Congress at its next session with the necessity for immediate action in unlocking the doors so long closed to water power development. Conservation of oil, while advisable, is not the only reason for action. Construction of hydroelectric plants, in nearly all of the streams, means reservoir capacities and the triple purpose will be served of flood control, power and added water for irrigation.

The future of our industry on the Pacific Coast was never brighter. With the intensified education predominant here in the utilization of our commodity, and with a certainty of a proper return upon capital being given and with the lessons learned at this Convention respecting contact with the public and the consumer as well, it is certain that the demand for electricity will continue and increase. Not the least of this demand will arise from the installation of house appliances, particularly the electric range, which is now reaching a price and an efficiency that, with the low rate offered by the Pacific Coast companies, should make it a very strong competitor of the gas range and its use should be further exploited.

In the reconstruction of the nation following the war, labor must be fully considered, and with the suggestions heretofore made and cooperation with labor there should be no difficulty in the adjustment of all of our problems.

Legislation.—As contained in previous reports, your Committee strongly recommends to the companies a more careful consideration of its relation towards legislation. It does not mean by this that corporations should again enter politics, but it does mean that the corporations with millions of invested capital in this state should see to it that in a fair and just way they should be protected by such educational knowledge of the masses that the representatives in legislative bodies will have due cognizance of their rights, and therefore increase rather than diminish the tendency toward legislation that will be helpful. In the next two years steps should be taken by the companies to secure this position.

Municipal Ownership.—Municipal ownership is still rampant, under misguided and misinformed conditions. Much of the spirit that engenders municipal ownership can be arrested, in the judgment of your Committee, by a policy of publicity that should be the same throughout the territory of the organization. Municipal ownership arises primarily from some misguided policy instituted by some public utility, in which an error of judgment on the part of the utility provokes the righteous indignation of right thinking men, and the only relief apparent is in the service to itself by the municipality; and once this seed is planted there are plenty of people who, without due knowledge of what they are discussing,

CALIFORNIA ELECTRICAL COOPERATIVE CAMPAIGN

Whereas We are fully convinced that the best interests of society are served when equal opportunity is accorded to all men in the development of our natural resources and in the merchandising of electrical appliances, supplies and apparatus connected with this development, and

Whereas, There is today existent in California a movement known as the California Electrical Cooperative Campaign, which is preaching broadcast throughout the confines of our state the gospel of cooperation in which it is recognized as a fundamental axiom that "He profits most who serves best," and

Whereas, Through the Advisory Committee and the Field Representatives of this organization effective results are already being obtained in the bettering of our industry,

Therefore Be It Resolved, That we, the members of the Pacific Coast Section, N. E. L. A., in convention assembled at Coronado, do hereby heartily endorse this movement and pledge to it our unqualified support, and it is hereby recommended that our central station membership continue their support during the coming convention year on the same generous basis of past assessments.

become rabid advocates, and the people with no knowledge of the situation are generally led by such forces.

The underlying motives creating municipal ownership are two-fold—first, dissatisfaction with the utilities' action, whether applied to the municipality or the public; and second, the misleading statements of low costs of operation and large profits, which are contrasted with prices charged in other sections by privately owned utilities. Both of these fallacious arguments may be successfully met, if the public utilities will move with one accord on the first motive, and to destroy the second motive secure legislation which will provide at least for some responsibility which will cause the municipally operated utility to keep its account by the same methods that privately owned utilities are required to keep them. On the same basis of determined costs no privately owned utility need fear comparison with the publicly owned.

The Committee in conclusion congratulates the Convention upon the work it has accomplished during the past year and wishes the continuance of that success for the year to come.

Commercial Problems of the West

(With the gradual cessation of abnormal demands on central station output, interest in the electrical range revives—and is to assume considerable importance in the coming year, according to discussion developed at the Coronado conventions. The training of sales personnel, possibilities before the contractor and dealer, relations with the architect and the selling of the idea back of the goods were among the subjects which received especial attention.—The Editor.

REPORT OF THE COMMERCIAL COMMITTEE

Meeting War Conditions

From the standpoint of the Commercial Departments of our member companies, the past year has been unusual in many respects.

Large demands for power and the necessity for conservation of electrical energy, resulted in many companies finding it unnecessary to solicit business. Rates to consumers were low as compared to costs of other power and, with the increasing price of oil, many private plants were voluntarily shut down and central station service substituted.

Capital for new business development was meager, owing to the restrictions of Federal Commissions, the reluctance to raise funds for public utilities in the face of our Government's needs, the low market value of securities, and the high price of money and material entering into all kinds of construction.

To offset the abnormally high operating costs, relief was granted through emergency surcharges, to those central stations showing the governing bodies that uncontrollable expenses had increased to such an extent that assistance was required. This was necessary in order that the properties might be satisfactorily operated and the public properly served.

The work of the California Electrical Cooperative Campaign during the year deserves careful and thoughtful attention. Under the supervision of the Advisory Committee, a condition is rapidly being brought about which gives better electrical service to the public, and incidentally more profit to the individuals and companies in the electrical industry. The results obtained through the Campaign will be considered as satisfactory, and indicate conditions of a still more satisfactory character during the present year. Chairman L. H. Newbert's Annual Report of the Campaign work has been printed in pamphlet form and is now being distributed.

Commercial Papers

I have great pleasure in directing the attention of the Convention to the high character of the papers to be presented at the sessions of the Commercial Section. These papers have been carefully prepared by men well qualified to discuss the live topics which are to be considered here. The keynote of the papers is Cooperation; Cooperation that really cooperates; Cooperation that will develop better public utilities, better business concerns, better employes, better sales methods, better service and better relations with the public. Much has already been accomplished, yet much remains to be done.

(Here followed an enumeration of the papers which must be omitted, owing to lack of space.)

The war has been won! We are now passing through the readjustment, or settling down period. It is expected that this period can be measured by months, and after then, with great industrial activity, increased population, large developments in hydroelectric plants, money available for extensions and new business promotion, broad gauge cooperation between ourselves and with the public, we should soon begin to witness the beginning of an unprecedented development of the resources of the Pacific Coast.

REPORT OF COMMERCIAL COMMITTEE SESSION

Thursday Morning, April 30, 1919

Session was opened by A. W. Childs, the chairman, with about 100 delegates present.

THE PROPER TRAINING OF THE SALES PERSONNEL

In presenting the first paper for discussion, "The Proper Training of the Sales Personnel," **L. H. Newbert,** Pacific Gas & Electric Company, San Francisco, outlined briefly the necessity of a carefully selected and highly trained organization in electric utility companies, pointing out that the utility company of today is almost as much a purchaser as a seller—as much a buyer of good will to be paid for in services as it

A BUREAU OF PUBLIC RELATIONS

Whereas, The electric utilities are engaged in efforts whose success is largely dependent upon an informed and a favorable public opinion,

Be It Resolved, That a bureau of public relations be established under the direction of the Public Policy Committee to collect and disseminate information calculated to create and maintain a friendly public attitude toward the electric utilities.

is a seller of kilowatt hours. To be successful it must be on harmonious terms with the population it serves and in this line of its operations the salesman, as the point of contact, is not only important—he is absolutely essential.

In the selection of salesmen, Mr. Newbert urged that they be taken from the ranks of the company in order to be assured of two very essential characteristics—faithful service and loyalty. Unquestionably integrity and honesty are, however, he stated, the first requirements, because of the company's reputation with the public depending very largely on that of its salesmen who quite frequently, in the eyes of the public, are the company.

In training the salesman, it is essential that he be thoroughly schooled in the policies of the company and the workings of its every department. In addition to the closest possible contact and cooperation with his own organization, he must familiarize himself with every detail connected with the appliance or service which he is delegated to sell. With the present day tendency in rate fixing toward scientific rates, it devolves upon the salesman to understand the principles of rate making and be capable of picking out the most economical rate for his customer's conditions, working it out to the latter's complete satisfaction and understanding, if possible. Much information can be gained from trade journals and the salesman should be encouraged to read them regularly.

Mr. Newbert also touched upon various ways in which the salesman may be of value to the company outside of his regular duties, such as interesting himself in the various activities making up the life of the community as well as adjusting complaints and disputes between consignees and any department of the company or any trouble connected with the company's services.

In the discussion on Mr. Newbert's paper **R. H. Ballard,** Southern California Edison Company, Los Angeles, emphasized the point that the salesman is the first point of contact between the company and the consumer and that the impression left by him will have great weight; that part of the service on the part of the salesman would require that he see to it that the consumer is well taken care of from the minute the contract is signed and the friend he has made in the consumer be accorded every courtesy from every department of the company. "A salesman who knows his business," stated Mr. Ballard, "cannot help being enthusiastic for the company and for the service as a whole. He it is who paves the way for the partnership between the company and the consumer."

John A. Britton, Pacific Gas & Electric Company, San Francisco, following Mr. Ballard, humorously announced that a salesman possessing all the characteristics mentioned by Mr. Newbert would not be a salesman but an executive officer. "The primary qualification," stated Mr. Britton, "for a salesman is his ability to approach people and present the argument." Mr. Britton urged closer contact between the salesman and the executives of the company. "Every salesman," he said, "should be known by the boss and should himself know the policies of the company, getting them from the boss. It makes no difference whether he is selling ranges, appliances or anything else, he should know the policies of the company." Mr. Britton strongly urged the education of salesmen in the company's business. He advocated the visiting of power plants, substations, warehouses, offices and garages for the purpose of thoroughly understanding the business. In passing on the highly specialized phase of the electric utility salesman, he stated, "A man who can sell drugs or dry goods cannot sell electricity without an education in the electrical line, as it is a peculiarly specialized line." "The West," he said, "is particularly fortunate in having wide-awake salesmen."

Taking up the discussion from the manufacturers' side of the question, **K. E. Van Kuran,** Westinghouse Electric & Manufacturing Company, Los Angeles, took exception to the premise of the authors that the sales department is the all-important branch of any industry. "Experience teaches us," he said, "that the all-important, dominating feature of any business, and particularly the electrical business of today, is Service. Service can only be rendered through the proper coordinated effort of every person, section, division and department. In considering the training of the sales personnel, let us apply the principal features of this training to every department of the company and to every branch of the industry, with some additional features added for the specialized branches of our work.

"In the selection of salesmen, the first consideration should be the applicant's understanding of human nature. If we assure ourselves, first, by means of a proper analysis, that the prospective salesman has mastered the basic principles underlying this understanding of human nature, we need have no concern as to the matter of unquestionable integrity and honesty for this will follow through proper direction."

In closing his discussion, Mr. Van Kuran emphasized the need of what he termed "headers and interpreters" rather than "Loyalty and the Big Boss" as quoted in the paper. "You can't train an employer to be loyal," he said, "and you can't purchase his loyalty by a salary. A company will receive the loyal support of its employes in just such proportion as the company in turn gives loyalty. The day of the former type of Big Boss has passed."

Following Mr. Van Kuran, **E. B. Criddle,** Southern Sierras Power Company, Riverside, strongly advocated the selection of young men, molding their minds and training them in the policies of the company and thoroughly schooling them in the company's business. Mr. Criddle declared the complexity of the business required an intensive system of training, stating that "one ill-considered act of an employe improperly trained will undo all the good work and work immeasurable harm to the company."

Glenn D. Smith, Ontario Power Company, Ontario, laid particular emphasis on the need of salesmen familiarizing themselves with the policies of the company as promulgated by the management. "Let the people feel," he said, "that the company is working for their welfare and in things in which they are interested."

In closing the discussion, **Mr. Newbert** referred to Mr. Van Kuran's criticism of the opening paragraphs of the paper and explained that this should be considered in connection with subsequent subjects of the paper.

HOW CAN THE ELECTRICAL INDUSTRY ASSIST THE ARCHITECT?

In presenting his paper for discussion **J. O. Case,** General Electric Company, Los Angeles, stated that he had attempted to show the mutual advantages and benefits to be derived from close cooperation between the four branches of the industry—central station, manufacturer, contractor and dealer—on the one hand and the consumer on the other.

Henry D. Bostwick, Pacific Gas & Electric Company, San Francisco, opened the discussion with a hearty endorsement of the recommendations made by Mr. Case that a committee, consisting of the Advisory Committee of the California Electrical Cooperative Campaign be instructed to work out a definite plan of action to be approved by the Executive Committee of the Pacific Coast Section, N. E. L. A., the California Association of Electrical Contractors and Dealers and the California Electrical Supply Jobbers' Association, the matter to be then taken up with the several local chapters of the Architects' Institute for their endorsement. To this end Mr. Bostwick offered the following resolution, which was heartily endorsed and seconded by Tracy Bibbins of San Francisco and unanimously adopted:

"Resolved, That it is the sense of this Commercial Section of the Pacific Section of the National Electric Light Association that the Advisory Committee of the California Electrical Cooperative Campaign Committee be requested to appoint a sub-committee known as the Architects Committee, and that the duties of this committee be to do everything reasonably possible under the general guidance of the Advisory Committee, to bring about closer relations between the architects and all branches of the electrical industry;

"Resolved, further, That the committee take tangible form by drawing up actual rules, plans and specifications for closer contact between the architects and the electrical industry."

Mr. Bostwick also advocated propaganda for constructive advertising by central stations.

Following Mr. Bostwick, **Capt. R. W. A. Brewer,** of San Francisco, called attention to the fact that the architect is not an engineer but that he does encroach on the latter's field from time to time. He cited the English custom in the preparation of specifications and submission of bids as an improvement over the American practice. "In England," he said, "when the electrical contractor is submitting a bid, he knows pretty closely what he is expected to bid on. The quantities and articles are stated clearly so that all the contractors will bid on the same material. The architect's work, however, should be limited to a stereotyped form of specifications to be prepared by the contractors." He strongly urged close cooperation between the contractors, architects and engineers.

From the manufacturer's standpoint, **Frederick D. Mills,** National X-Ray Reflector Company, San Francisco, spoke of the great strides made by the manufacturers in the past decade in the way of getting electrical devices introduced into buildings. "The architect must look to the manufacturer," he said, "for the cooperation necessary to standardize the use of electrical devices. Further educational work must be along the lines of showing the owner and architect that contracts should not be awarded solely on price but upon the responsibility of the contractor to perform his duty in living up to the specifications." While the manufacturer's obligation ceases with the production of his materials, he is dependent upon the contractor to properly install the apparatus. A faulty installation usually reacts directly on the manufacturer.

R. E. Eltringham of the California State Accident Commission stated that the Commission has been studying the question of a code for the past two years which will shortly be ready for submission. It is the present plan to combine this code with the Fire Underwriters' Code, making it fully representative of every industry affected. Mr. Eltringham urged the electrical industry to keep in close touch with the Commission in the framing of this code.

G. E. Arbogast, of the F. E. Newberry Electrical Company, Los Angeles, stated that before the war the cost to the contractor-dealers in California of helping the architect through advertising amounted to $4,000 to $5,000 annually. With a revival of business, he estimates an annual expenditure for new building of $50,000,000, about 5% of which will be expended for electrical work. He believes this percentage could be doubled by proper cooperation with the architects and recommended the employment of two men whose duty it would be to keep in close touch with every architect in the state.

SELLING THE IDEA

T. E. Bibbins, Pacific States Electric Company, San Francisco, endorsed Mr. Harper's idea as presented in his paper. To use Mr. Bibbins' words, "when it is considered in its broadest application, it means an adoption of the broad principle 'To Serve.' The public needs light and therefore the contractor, dealer, jobber, central station manager, engineer and manufacturer's responsibility is to give it light, and he is most successful whose imagination leads him to the most scientific and successful methods. Then the industries need power, and finally, and largest in possibilities, the home must be made more comfortable and the housewife's burdens lessened, all of which we accomplish best when we 'Sell the Idea.'"

R. M. Alvord, General Electric Company, San Francisco, stated that no real sales are made today unless they benefit the purchaser and give lasting satisfaction. The real salesman, therefore, looks for people who will really be benefited by his products. "Let the salesman become imbued with the idea that the consumer will benefit and he will be enthusiastic over his work," he said. Mr. Alvord strongly advocated the use of electric appliances by each salesman in his own home.

In closing the discussion, **Mr. Harper** called attention to the fact that a salesman seldom has to sell a person something he needs, but that while a person's needs are few, his wants are many and it is his wants which open the field to the salesman.

Stacy Hamilton, of the Portland Railway, Power & Light Company, Portland, Oregon, was a visitor at the sessions. Responding to a call from the chairman for a few remarks, Mr. Hamilton incidentally mentioned California as being a leading state in the sale of appliances.

PROGRESS OF ELECTRIC COOKING AND HEATING

In the absence of **Mr. Maddox,** who was obliged to cancel his trip at the last minute, **M. A. B. Nolliker,** of the Southern California Edison Company, San Bernardino, presented the paper.

Glenn D. Smith, Ontario Power Company, Ontario, opened the discussion, giving the experience of his company in building up the cooking load, with a gratifying result, statistics on which will be given in a later issue of the Journal of Electricity.

In the absence of **John J. Gibson,** Pittsburgh, Pa., **K. E. Van Kuran,** Westinghouse Electric and Manufacturing Company, Los Angeles, presented the former's discussion dealing with the question from the manufacturer's standpoint:

In general, the electric range and water heater have about the same standing with central stations as did the Mazda lamp in its earlier career. The educational work being done by central stations, jobbers, dealers and manufacturers to introduce the use of electric cleaners, washing machines, ironing machines, dish washers and other electrical home devices is also having a very strong influence towards the public demanding the electric range. It therefore seems necessary for the central station to consider seriously the arrangement of its affairs to take on electric ranges.

The point brought out by Mr. Maddox in regard to multiplicity of types and styles is a very important one indeed. The ultimate user must of course bear a large portion of the development expense but the industry as a whole can be very much benefited by keeping the number of styles and types down to the minimum, and I believe the work done by the Conservation Division of the War Industry Board brought this fact very forcibly to the attention of all.

The point brought out in Mr. Maddox' paper in regard to the proper rate for electric range and water heating should receive very serious consideration. It is of course essential that a comparatively low rate be established but the cost does not have to be nearly as low as wood, coal, or even gas. For the ultimate good of the entire industry, it is necessary that the sale of current for electric cooking and heating must be profitable.

The water heating situation seems to be in about the same relative position as the range was about five years ago,

and electric water heating deserves very earnest consideration by all parties interested. Undoubtedly water heating can be done very profitably to all parties, especially where an electric range has already been installed.

P. H. Booth, Electric Appliance Company, Ontario, followed Mr. Gibson's discussion, going into the subject in considerable detail. He said in part:

Mr. Maddox refers to the progress which has been made between November, 1913, and 1917—four years which might ordinarily be called a short period, but in electric range development this short period is full of wonderful progress. During that time the proper alloy to be used as resistance material for a radiant or disc type of burner, was perfected and made commercially usable, and in this fact alone more than in anything else, is it possible for us to put our finger on one of the causes for the present satisfaction prevalent among the users of electric ranges.

In order for a business to grow and increase continually, the goods must be made right, or as nearly right as it is possible to make them up to the time of their production. And during the four years above mentioned, the actual construction of the oven linings, fuse blocks, lead wires and other details of construction were considerably improved.

Referring to the fact above stated that there is a considerable portion of the people who are devotees of the electric range, this fact was most prominently called to your attention during the year 1918 when central stations in practically every community in the country were overloaded and it was impossible for them to take on any electric range load. As the result, no sales effort was put forth and the answer was that the inquirers and insistent consumers who would not be denied the use of electric ranges, impressed every one with the fact that the electric range had a real clientele of prospective purchasers who would not use anything else.

This is also brought very forcibly to our attention by the fact that one of the largest department stores in San Francisco, and also one in Los Angeles, has an electric range on demonstration continually as a part of the model kitchen installations. This is but a further evidence that the electrically equipped kitchen, as well as the electric range, has a decided following among the buying public, as there is no branch of home furnishing suppliers which is more in sympathy with the desires of the public than the department stores. They are ever alert to detect the first indications of what the public wants. And the fact that these department stores have chosen an electric range for their model kitchen installations is a challenge to the strictly electrical branch of the industry, that they must be on the alert if they are to be recognized by the public desiring to purchase electric ranges.

This indicates that if we are to satisfy the consumer on articles for the home, whether they be refrigerators, electric heaters, gas ranges or electric ranges, these articles must be considered from the viewpoint of their appeal to the purchaser and the assortment of designs from which the purchaser may take his choice. The consumer or buyer (usually a woman) desires variety of choice in order that her fancy or discerning judgment may be appealed to and she may be made to feel that she is deciding what she wants and is not being forced to buy what some man fancies a woman needs in her home and her housework. There is another branch of the electric cooking load to which Mr. Maddox has not referred but which is coming forward into prominence with leaps and bounds, and that is the hotel, restaurant and bake-shop equipment. I hope that one of our succeeding conventions will provide for more time to be given to the importance of this hotel, restaurant and bake-shop electric equipment.

There is no piece of electrically heated apparatus that is used in the home which has caused so much grief to the manufacturer, jobber and central station as the water heater proposition. General types of heaters now on the market can be assumed to be practical and durable and it but remains for the central station to study the water heating business carefully and decide upon a rate or rates applicable to the different types of heaters, if necessary, so that the competition may be met and the electric kitchen completely equipped may be a reality.

E. H. Richardson took the point of view that the progress to be made is largely a question of what we can give the consumers for their money; i. e., in quality and service at limited cost. Mr. Richardson took issue with Mr. Booth on the question of number of models and agreed with Mr. Maddox that "the fewer models we can get along with, the lower the cost will be, both to the manufacturers and the dealers. The number of models which are finally agreed upon by the industry will become a very important factor in purchasing and handling ranges."

To a considerable extent, the troubles experienced with electric appliances, Mr. Richardson believed, depend upon the judgment and general discretion of the user. Hence the need for a certain amount of systematic work in an educational way with the consumer.

Mr. Richardson did not anticipate a great deal of further development in the water heater. This problem is, he thinks, a rate question and as such is primarily up to the central station.

Mr. Libby, of the Simplex Electric Heating Company, related the experience of the Boston Edison Company with a flying squadron of 17 women in a range campaign and of heavy duty ranges installed for the government in the past two years.

M. A. DeLew and **L. H. Newbert** also discussed the paper.

THE CONTRACTOR-DEALER OF TOMORROW

Discussion of Mr. Rendler's paper was opened by **A. H. Halloran** in the absence of **Arthur Kempston,** San Francisco. Mr. Kempston's paper recommended the discontinuance of the term socket appliance and definite provision for educating the public in the need of special outlets.

D. E. Harris, Pacific States Electric Company, San Francisco, spoke of the work of the California Cooperative Campaign Committee and of the possibilities offered by the Pacific Coast Section, N. E. L. A., for closer cooperation between contractor-dealers and central station men. According to Mr. Harris, the contractors must continue to develop store and advertising methods and must arrange advertising to tie in with the advertising of the manufacturers.

M. A. DeLew frankly stated that it is right "up to the contractors and dealers themselves to keep abreast of the times and do things."

Carl Heilbron, dealer, of San Diego, waived aside all distinction between branches of the industry, maintaining "there are not four branches but merely one big problem. The objective is the ultimate consumer (The Man on the Street). The problem must be looked at in the big, broad way with no disagreement or dissension." Mr. Heilbron urged that the destinies and demands of the public be studied and analyzed. "Service," he announced, "is divided into two parts: First, pre-sale service, which comes before the sale is made. To this phase, almost exclusively, all thought and attention has been given for years. Second, post-sale service, which comes after the sale has been made." As an illustration of the latter, Mr. Heilbron stated that his firm uses a trade mark to show that they stand back of every article sold, and that the responsibility does not cease with the merchant after the sale has been made but continues indefinitely thereafter.

Western Problems of Engineering Interest

(A strong recommendation of railway electrification in the West and a discussion of the problem of the formulation of a safety code formed part of the report of the Engineering Committee. The discussion of engineering papers centered about problems of immediate interest which had developed through the exigencies of the war and after the war period just passed. —The Editor.)

REPORT OF THE ENGINEERING COMMITTEE

H. A. BARRE, Chairman

Effects of War

The work of the Engineering Committee for the year 1918 was so seriously affected by the disturbed conditions of the country, and the organizations of the member companies were so reduced by the draft and the influenza that the Committee decided to place its work on the basis of strictly war and economic essentials and not attempt the usual field work and investigation of special subjects of general interest.

The Sub-Committee on Insulators was continued with the idea that since the program of investigation at Stanford University laid out during the previous year could not be carried out, the operating experience of the companies should be recorded and classified.

After the date of the armistice the Insulator Committee made a further investigation of the possibilities of continuing the Stanford tests. It was decided that it was still undesirable to consider continuing the tests until the university should have resumed a more nearly normal condition.

The manufacturers and the operating companies have made available for the purposes of the tests a very considerable number of insulators, both mounted and unmounted, and it is thought that it is desirable to continue the work laid out, or some modification of it, as soon as practicable.

Interchange of Facilities

During the war the Committee attempted to extend the application of the principle of interchange of facilities to other things than power plants and transmission lines. It attempted to keep the companies advised of each others' spare and unused apparatus, such as transformers, motors and the like, in order that it might be used in places where its value would be greatest to the country and to the industry as a whole. It also attempted to render the services of experts in any line of work in one company available for the use of other companies, particularly where similar men in those companies had been called into the service of the United States. Mr. Harry Sessions was appointed a sub-committee in the matter of interchange of apparatus, and Mr. J. E. Woodbridge in the matter of exchange of personnel.

The armistice was declared shortly after these arrangements were made and rendered their continuance unnecessary. Mr. Sessions' comprehensive paper in the Journal of Electricity of February 1st very clearly shows the benefits to be derived by the following out of this idea under normal as well as abnormal conditions.

The Line Safety Code

The report of the Sub-Committee on Line Safety Code was received by the Engineering Committee and officially transmitted to the Railroad Commission. It is felt that the Pacific Coast companies have given the Railroad Commission in this Code the best of their knowledge and experience covering the requirements of Pacific Coast conditions, and particularly California conditions, and that the Engineering Committee, and also the Pacific Coast Section, stands solidly behind the recommendations of this sub-committee.

It has been found that the Bureau of Standards objects strongly to the idea that a Code differing from that prepared by itself should be given consideration. It is the opinion of the Engineering Committee that it is of more importance for the Pacific Coast companies to have a practical workable Code simplified and made applicable to conditions with which Pacific Coast engineers are familiar and entirely competent to pass upon, than to attempt to put into effect the Code prepared by the Bureau of Standards. The fact that the Bureau of Standards attempted to cover the whole of the United States makes its Code necessarily of somewhat remote application to our local necessities.

The Committee has experienced a feeling of concern over the extent of the activities of the Bureau of Standards in respect to the regulation of public utilities.

In addition to the National Electric Safety Code above referred to, the Bureau of Standards has issued a circular of Standards for Electrical Service (Circular No. 56) and has under consideration—

A National Gas Safety Code.
A Set of Standards for Gas Service.
A Modification of the National Electrical Code issued by the Board of Fire Underwriters.
Street Lighting Service.

It is reported that it is contemplating a plan of establishing Standards of Public Utility Ethics governing the relations between the public authorities, the public, and the public utility companies on questions of rate making, valuation, capitalization, financing, franchises, and public relations generally.

The Committee seriously questions whether the results of such activities will be of benefit to the industry and to the public. It is its opinion that the standards and procedures developed by the large body of experienced men in the industry must necessarily have greater weight than the studies and compilations of a group of scientists who have had no personal connection with the industry.

It should be recognized that strict standards throughout the country may not result in the greatest economy and the best service to the community, and the fact that different groups of men work out different solutions for the same problem is not a dis-

advantage. A difference of methods frequently leads to new developments which the strict following of a standardized method would preclude. In the opinion of the Committee, one of the reasons why the United States went to war was to avoid the plastering of "verboten" on the walls of buildings of American industries, and that the Bureau of Standards is showing evidence of a tendency toward the establishment of an entirely unnecessary bureaucratic control in all public utility matters.

What we really need is assistance to get the things done that need to be done, instead of so many reasons why things cannot be done.

Railroad Electrification

The Committee has given some consideration to the matter of railroad electrification.

Under date of January 18th the Engineering Committee submitted to the Executive Committee a recommendation as follows:

"Operating economics and pressure of public opinion and of governmental controlling bodies may result in the electrification of some extended portions of the railroads of the country much sooner than had been anticipated before the change in conditions brought about by the war.

"It should be the business of this Association to prepare the electrical industry as thoroughly as possible for this eventuality.

"It is exceedingly desirable that when electrification takes place on an extensive scale, it should be of such a character that installations not closely connected at the present time may be of such a standardized character that they will form parts of what will ultimately become a unified system.

"The method of attacking such a problem in the past has been for the different manufacturing companies to approach it from their individual standpoints and try out widely different methods which, though perhaps of equal value, could never be made a part of a standardized and unified system.

"It would appear that the importance of this question now warrants a broader treatment and that steps should be taken looking to the application of the engineering talent of the manufacturing companies to the development of apparatus and methods best for the country as a whole rather than for some more immediate and unquestionably short-lived commercial advantage for the individual manufacturer.

"There are four interests which must become closely associated if the problem is to be solved properly:

1st. The railroads
2nd. The power companies
3rd. The manufacturers
4th. The regulatory bodies of the Government

"It is very desirable that a plan should be made whereby these bodies may be enabled to undertake a solution.

"The Engineering Committee of the Pacific Coast Section of the National Electric Light Association regards this matter as being without exception the most important that is before it, and recommends to the Executive Committee of the Section that the latter should take whatever steps may seem to it proper to bring about the development of a standardized uniform system of methods and apparatus for the electrification of steam railroads.

"The Engineering Committee has not made any attempt to recommend the manner in which this suggestion should be carried out, but the assumption is that it will be referred to the various National bodies in some way."

This letter was transmitted by the President of the Pacific Coast Section to the President of the National body by the following letter of transmittal:

"The accompanying letter from the Chairman of the Engineering Committee of the Pacific Coast Section of the N. E. L. A. was presented before the meeting of our executive committee on Jan. 18th. As its subject, railroad electrification, is one of National rather than of local interest, it was felt that whatever might be done along the lines indicated in Mr. Barre's letter should be started by the National Association, rather than the geographic section.

"Consequently I am referring the matter to you for such action as its importance justifies. It would seem desirable to first take it up with the several manufacturers. When they give assurance that uniformity and standardization of equipment is possible, the national engineering committee should be able to bring about the desired cooperation between the railroad and the power companies.

"I will greatly appreciate your advices from time to time regarding the progress of this matter, which gives promise of being of early and vital importance to this section."

It will be noted that the purpose of this recommendation was to bring up for consideration the possibilities of development of a system of railroad electrification of reasonable uniformity, particularly as applying to the necessities of the southwestern states.

Under the date of March 28th, 1919, the San Francisco Section of the American Institute of Electrical Engineers appointed a committee, of which Mr. J. E. Woodbridge is the chairman, to investigate the problem of railway electrification and keep the section advised of the available information on the subject. It has appeared to the Committee desirable that the Pacific Coast Section of the N. E. L. A. should keep in as close touch as possible with this committee and its activities and should give the San Francisco committee such assistance as it can.

(There follows an enumeration of papers which space will not permit of printing.)

ENGINEERING PROBLEMS IN THE WEST

INSULATOR COMMITTEE REPORT

H. L. Garbutt of the Westinghouse Company delivered a paper on the subject of Insulators which will be given in a later issue.

E. B. Snyder of the Ohio Brass Company spoke of the great recent improvement in porcelain body as developed by the manufacturers and also the improved manner of handling insulators during the process of manufacture.

Mr. Snyder stated that the handling given insulators was responsible in a large way for their successful operation. The manufacturers are planning on giving the insulator subcommittee their fullest cooperation in the tests of insulators.

C. O. Poole of the Southern Sierras Power Company stated that it was his opinion that the daily and annual cycle of temperature changes were responsible for a large part of those insulator failures not directly caused by outside physical reasons. His experience has been that out of some 10,000 to 15,000 insulators 98% of the failures occurred between the end of the pin and cap and that this was due to the expansion of the pin. He noted a particular batch of insulators manufactured in 1904 which had been giving years of service at 35,000 volts and then placed in operation on a 55,000 volt line in a very hot climate. During the last five years there has been but one failure in this batch of pin type insulators.

J. P. Jollyman of the Pacific Gas & Electric Company stated that in his opinion much better results would be obtained by a higher factor of safety in line insulators by the use of additional units since the cost of the insulators themselves was a small part of that of a steel tower transmission line. He mentioned his experience with insulators made in 1912 and that he had experienced no failures on 100 kv. lines and but very few on 60 kv. lines. On pin type insulators the percentage of faulty insulators during a twelve year period was given as 5%. These insulators were of four-part construction. He could not state that these failures or faults were discovered in any one particular part of the insulators but were distributed. He advocated the use of less severe tests on old insulators as they have shown that they are capable of insulating a line and they should not be broken by testing at extreme voltages.

R. S. Masson of the Arizona Power Company referred to the Hewlett type of insulators and gave it as his opinion

that one reason why he had experienced such satisfactory results with them was that there was a smaller mass of metal between discs and as a consequence the units nearest the line did not have to do all the work.

J. A. Lighthipe of the Southern California Edison Company stated that he had made some experiments on the Hewlett insulators on a short stretch of 60 kv. line and that there had been no failures in these insulators during the six years of the test.

Mr. McClelland of the Electrical Bond & Share Company, New York, stated that the Colorado Power Company has made extensive use of the Hewlett insulators and that since 1906 they have been almost entirely free from failures.

J. E. Woodbridge of the Sierra & San Francisco Power Company stated that there was one need of good insulators not ordinarily noted and that was that in many cases it was practically impossible to take a line out of service for the purpose of making any tests on the insulators due to the nature of the load. He indicated that more money might be spent to obtain insulators which could be guaranteed as being better in order to avoid the construction of additional lines.

D. J. Butts of the Western Electric Company stated that in the past great difficulty had been experienced in the manufacture of Hewlett insulators but that recent developments had enabled these insulators to be turned out in quantities at reasonable prices.

C. P. Osborne of the Portland Railway Light & Power Company stated that his company made annual tests with the Megger on all transmission line insulators and required them to pass a 200 megohm standard.

J. A. Koontz of the Great Western Power Company gave an outline of the proposed work of the Insulator Committee. It is planned to continue an extra elaborate series of tests to determine particularly the effect of temperature changes on insulators. It is hoped that investigations may also be continued on the subject of the porcelain body.

REPORT OF APPARATUS COMMITTEE

S. J. Lisberger of the Pacific Gas & Electric Company reported for the Apparatus Committee that they recommended the adoption of a standard for transformer polarity and that the subtractive polarity was much to be preferred.

EMERGENCY INTERCHANGE OF POWER

R. H. Ballard of the Southern California Edison Company spoke of the general advantages and duty of companies to interchange. He stated that he recognized the fact that the public was entitled to the avoidance of duplication of equipment and plants and that the greatest use should be made of all the facilities already at the disposal of any given territory. In his opinion it might well be considered a function of the regulatory bodies to compel the connection of power companies and the interchange of power.

President E. O. Edgerton of the Railway Commission said that a regulatory body would experience great difficulty in carrying out the proposal of Mr. Ballard, in that the assumption of such authority would extend itself to questions of the development of power and would have to decide as to which company of those interconnected should develop power first and in what quantities. It might also devolve upon the Commission even to determine in the case of interconnected systems, as to what new consumers should be supplied and which company should supply them. He stated that the question of interchange should finally result in consolidation, as this step would solve all the problems which would be difficult of solution in the case of interconnection.

Mr. McClelland of the Electric Bond & Share Company disagreed with President Edgerton in that his experience indicated that in the case of interconnected companies, no difficulty was usually experienced in working out the solution of the questions referred to. Usually one or the other of the companies was more than anxious to permit the others to develop power or serve or refuse consumers.

H. A. Barre of the Southern California Edison Company gave it as his opinion that interconnection was a comparatively simple matter from engineering and operating standpoints and that it was purely a business question to be decided between the several managements.

C. O. Poole of the Southern Sierras Power Company noted a method of interchange of power which is to be accomplished during the coming year by the Southern Sierras Power Company and the Southern California Edison Company, California, by which Southern Sierras will operate a 6,000 kw. plant separate from the rest of their systems and transmit the power over one or two 135 kv. lines from Bishop to San Bernardino, a distance of 240 miles. At the latter point connection would be made directly to the system of the Southern California Edison Company.

D. D. Morgan of the Southern California Edison Company spoke of the operating troubles which might be experienced during the course of interconnection which could only be avoided by making interconnection at more than one point.

P. O. Crawford of the California-Oregon Power Company spoke of the great advantage of interconnection at those times when it was necessary to take a large generating unit out of commission for purposes of repair.

R. J. C. Wood of the Southern California Edison Company pointed out the large particular saving to be obtained by the use of economy in steam plant operation through operation on block loads at a consequent increase in efficiency which would be further increased by the improvement in load factor by interconnection.

REPORT OF COMMITTEE ON LINE SAFETY CODE

S. J. Lisberger of the Pacific Gas & Electric Company reported for his committee that they had prepared a code and had transmitted it to the Railroad Commission for approval and issuance as an order of the Commission.

L. S. Ready of the California State Railroad Commission stated that this code was now being subjected to the scrutiny of the Commission by means of comparisons between it and the several systems. A field inspection is being carried out covering the whole state, which, when completed, will enable the Commission to give their conclusion. He stated that in his opinion, a code formed by those of the industry in this state would be of very much greater value to us than any code issued by the Bureau of Standards, since our conditions were so vitally different from those in the East. Of necessity the code issued by the Bureau of Standards would be very complex in its phases so as to be applicable to such a large territory.

RELAY PROTECTIVE SYSTEM

F. E. George of the Pacific Gas & Electric Company agreed with the author of the paper in that the Western companies should be more energetic in their study and application of relay protective systems. His experience was that the use of more than one relay at a certain point was a very good policy in that a broader range of conditions was met. His company has not had a very satisfactory experience with the use of relays at line potential. The present state of the art has required that auxiliary switches be installed to limit the operation of certain relays at certain times. This would indicate that large improvements in relays are yet possible.

Mr. Halpenny of the Southern Sierras Power Company noted that the rapid expansion of systems into complicated network made the subject of relay protection one of great importance in that the addition of lines tended to add to the number of interruptions suffered by a station rather than

to increase the reliability of the service unless proper steps were taken to protect against failures. The increasing use of outdoor equipment indicates that the use of relays at line potential may be greatly limited.

J. P. Jollyman, Pacific Gas & Electric Company, questioned the availability of the balanced relay for use on B-Y connected grounded systems or on delta systems at the time of the occurrence of a ground some distance from the location of the relay. He pointed out that the use of relays intended to operate on a slight increment in current at the time of a short, was impractical and in his opinion a relay based on the balance principle would be much more satisfactory in such cases. Mr. Jollyman also stated that the field is not yet fully covered and that the manufacturers should give more attention to this matter.

J. A. Koontz of the Great Western Power Company emphasized the necessity of analyzing the case before attempting to design a suitable protective scheme for application to any system.

J. E. Woodbridge of the Sierra & San Francisco Power Company stated that his years of experience with relays indicated that usually at the time of a severe short circuit, the relays did not porform the function for which they were designed, often because of mechanical failures of the relays themselves, due to the large magnetic forces. He deplored the fact that relays are not given the careful attention in manufacture to fit them for the work they are required to do.

Mr. Morris of the Westinghouse Electric & Manufacturing Company said that in a way the West was more progressive than the East in that if we did not find a relay on the market which fitted our needs, we made our own relays.

H. H. Cox of the Southern California Edison Company asked what provision could be made for compensating the relay settings between those times when the capacity of the generators connected to the system varied.

L. A. S. Wood of the George Cutler Company of Indiana brought out the fact that one of the first necessities of an analysis for the purpose of applying protective devices was a study of the past history as regards interruptions, and in this way the location of the point or points at which it is possible to install protective relays.

G. E. Armstrong of the Southern California Edison Company stated that his intentions were to avoid the use of any relay which depended for its action upon the absolute value of voltage or current. In this way many of the faults of the present relays and the necessity for careful calibration and testing would be eliminated. Further, all the installations proposed were devised so that no attention was necessary on the part of the operators. The question of outdoor relays at line potential was answered in that these relays would be shielded by small covers and the necessary power for moving along a heavy insulating stick would be obtained by placing a small battery on an insulator and in this way avoiding the likelihood of failure to operate due to small energy available.

AUTOMATIC INDUCTOR GENERATING PLANTS

C. E. Valk of the General Electric Company stated that many of the smaller water powers not now developed could be developed by the use of automatic generating plants, but that in his opinion the synchronous generator was much to be preferred above the induction generator and that the increased cost of the former would be only 15%. He further stated that the real secret of the successful operation of automatic plants was in providing capable, intelligent supervision for the apparatus installed.

P. M. Lincoln of the Westinghouse Electric & Manufacturing Company stated that even in a small plant human intelligence must be applied even through the person of the inspector, or by the addition of sufficient relays which would give this effect. In his opinion the field for automatic generating plants was limited to the smaller size plants.

J. H. Lighthipe of the Southern California Edison Company stated that the development of the electrical interest in California was through the development of small plants and that the time is now here for the conversion of these plants into automatic operation. He further stated that the present magnitude of the systems was such that the smaller plants might be automatically removed from the line at the time of trouble without loss.

J. Hood of the General Electric Company said that it was the labor cost in plants of low load factor and small plants which was the determining factor and that the use of automatic equipment was the only way in which they were economically possible.

E. A. Quinn of the San Joaquin Light & Power Company stated that he expected these automatic stations to pay for themselves in three years. These plants have been operating at approximately 75% power factor.

CONVERTING STEAM PLANT TO STANDBY OPERATION

W. Euler of the Great Western Power Company stated that in his opinion a double bus was absolutely necessary in a standby steam plant so that it would be possible to transfer load from the plant to the transmission lines in case of failure. Direct connected exciters were much to be preferred to standby plants. The cross connecting of dry vacuum pumps is another desirable feature.

R. J. C. Wood of the Edison Company called attention to the cooling of turbine blades when a machine is floated on the line and referred to certain investigations he had made which indicated that a small quantity of steam admitted to the header would permit the blades to operate at no more than normal temperature.

R. S. Masson of the Arizona Power Company stated that during one month his 5,000 kw. plant had operated on an 8% load factor and during this time he had obtained an economy of 78 kw-hr. per barrel.

KILOWATT-HOURS PER BARREL OF OIL

R. J. C. Wood of the Edison Company stated that his practice was to consider the economy of a steam plant as being the net delivered to the transmission system, even going so far as to discount from the net output during any period that amount received by the plant from the transmission lines when the turbines were floated. In his opinion it was not just to any plant to compare it against another on a kw-hr. per barrel basis in that the character of the prime movers might be radically different and each of the plants might be operating on what to it would be a 100% basis.

Mr. Wyatt of the Los Angeles Gas & Electric Corp. pointed out that the many factors entering into ultimate economy of a generating plant made a comparison on a kw-hr. per barrel basis very unreasonable.

F. O. Dolson of the Southern Sierras Power Company stated that his practice was to subtract the amount of power used for auxiliaries and for floating on the line from the gross output and the net result was therefore the actual energy delivered to the lines.

Session of Friday Afternoon, May 2, 1919

MAGNAVOX

P. L. Jensen of the Magnavox Company gave a very interesting explanation of the devices manufactured by his company and explained their application to aeroplanes and other uses evolved during the war. This device was recently demonstrated in Washington, D. C., at which time an aviator, in an aeroplane 3000 ft. above the Treasury Department, read to an assembled audience of 50,000 people President Wilson's

Victory Loan address. Every word spoken by the aviator was clearly heard by the audience. Mr. Jensen demonstrated the fact that his transmitter is impervious to extraneous noises by speaking through it while it was being held in the funnel of a phonograph. Those not having receivers could not hear what he said from a distance of ten feet, due to the noise of the phonograph, but through the receivers only Mr. Jensen's voice was heard.

J. A. Lighthipe of the Southern California Edison Company pointed out the fact that the loud speaking receiver and sound-proof transmitter should be of inestimable value to operators in noisy power houses. He further pointed out that it should be possible by means of these devices for the operators to be able to transmit and receive instructions without the necessity of leaving the operating board and entering a sound-proof booth.

H. A. Barre of the Edison Company stated that Mr. Jensen's remark that it might be possible through an elaboration of this device to mitigate the effects of inductive interference, is worthy of careful consideration, in that it might indicate that the telephone companies may be in a position themselves to effect some steps to decrease the evils of interference without requiring the power companies to expend large sums to avoid interference.

PULVERIZED FUEL

R. J. C. Wood of the Edison Company emphasized the fact that the dust problem in connection with the use of pulverized coal should be carefully considered when comparing the relative merits and costs of coal and oil. The fact that the pulverized coal of California contains a relatively high sulphur content, would indicate that the tubes and drums of the boilers would be subjected to an increased danger from corrosion, due to the formation of sulphuric acid at those times when the boiler was cooling down and the steam and moisture in the furnace condensed on the surfaces of the metal.

H. E. Linden, of the Beckman & Linden Engineering Corporation, called attention to the fact that Mr. Delany's quotation of a boiler efficiency of 75% for pulverized coal was somewhat low as indicated by a number of tests from which he quoted the fact that boiler efficiencies were found to range from 78% to 82%. Mr. Linden further stated that his experience was that Mr. Delany's figure of $1.00 per ton is somewhat high and quoted cost of pulverizing as being from 55c to 35c per ton in daily capacities of from 100 to 1000 tons. Mr. Linden stated that approximately 10,000,000 tons of pulverized coal are being used annually in the United States. It is of utmost importance to dry the coal to prevent spontaneous combustion in the storage bin. Hot powdered coal cannot be stored, but cool powdered coal will give no trouble whatever.

Mr. Buell, Ione Coal Mine Company, called attention to the fact that our natural deposits of crude oil are being consumed at a very rapidly increasing rate and that at the present time we have consumed forty per cent of our available supply. Powdered coal experts have generally advocated enlarging the size of combustion chambers by raising the boilers or building dutch ovens in front of the main setting for the purpose of burning powdered coal.

P. M. Downing, of the Pacific Gas & Electric Company, said that more complete tests of this fuel on a large scale were imperative before serious consideration should be given to extensive use.

S. J. Lisberger, of the Pacific Gas & Electric Company, called attention to the large installation costs which would be required in order to make effective the efficient burning of this fuel. Dry storage in locations adjacent to the coast would be very difficult of attainment when the large quantities of fuel necessary for the operation of a plant of any magnitude is considered. The troubles which would be experienced in furnaces and arches through the use of this fuel in place of crude oil would be largely increased due to the relatively high furnace temperatures attained. Coal in this form will not stand one week in metal containers, although storage of a period up to 14 days might be reached in concrete tanks.

EXTENDING THE RANGE OF ACCURACY OF WATTHOUR METERS

J. A. Leach, Jr. of the Pacific Gas & Electric Company pointed out that revenues were based not only on the accuracy of meters but also upon the confidence of the consumers and this latter would be enhanced by the extensive use of any devices which would show that the power companies were doing all in their power to give the consumers a square deal.

C. M. Hoag of the Southern Sierras Company pointed out that the field for the use of the device developed by Mr. Knopp was just beginning to open up due to the fact that the use of larger capacity lamp-socket appliances is in its infancy.

J. P. Jollyman of the Pacific Gas & Electric Company stated that some of the manufacturers had agreed to incorporate this device in meters as manufactured if the customers were willing to pay an increased cost which would amount to some 15 to 20 cents per meter.

H. A. Barre said that in his opinion the most valuable adaptation for this device would be on meters measuring the consumption of large consumers where a very small percentage variation in accuracy would mean a comparatively large sum in money.

J. C. Abell of the Western States Electric Company said that the tests reported by Mr. Knopp, covering only a small number of meters, should not be accepted as a final proof of the value of this device in showing the amount of increased revenue.

ELECTRIC WELDING

John Hood had, at the convention, an electric welding outfit and made demonstrations. This particular outfit operated on the constant current theory and the current was supplied by a constant current generator. Samples of welds were made which thoroughly indicated that welds made by using metal electrodes with direct current were homogeneous and connected to the parent metal.

F. A. Anderson of the United States Shipping Board outlined the recent developments leading up to the present state of the art of electric welding due to pressure of war conditions. Mr. Anderson called particular attention to the theory of the transmission of metal from the electrode through the arc to the weld. His observations indicated that for a successful weld the metal must pass in a constant stream, giving the appearance of a stream of molten metal flowing from a small tube, extending from the electrode to the weld. Only when the process is conducted in this manner will a perfect weld be obtained. In his opinion alternating current arc welds were not commercially successful. He advocated the use of the variable voltage system.

W. B. Sawyer of the United States Steel Products Company in his remarks on the electrodes used for welding, clearly indicated that no one definite specification for electrode material could possibly cover every case, but that variations in the analysis would produce material which could be closely fitted to the needs of the individual cases or character of metals to be welded. Three important points determine the proper combination for electrodes: character of material, chemical composition and physical structure.

PRACTICAL LESSONS IN ELECTRICITY

BY H. H. BLISS

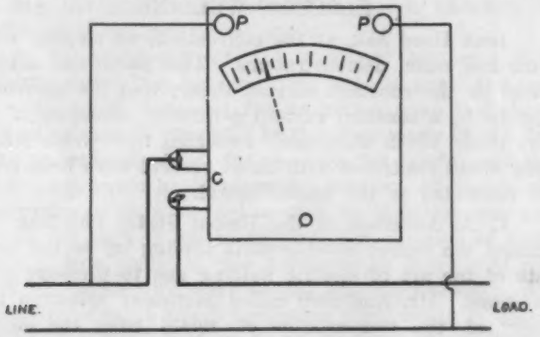
(What is the relation between a kilowatt and a horsepower? What is meant by efficiency? If you are selling electricity or electrical devices, or even if you are merely one of its users, there are a thousand simple questions which arise in your daily needs. These you may answer for yourself by taking advantage of the extension course offered by the Universities of California and Oregon. These articles appearing in the Journal of Electricity are used as a text—back numbers will be furnished for those beginning late.—The Editor.)

Editor's Note: Through an oversight in the editorial office, the fourth article of this series was run in place of the third in the issue of May 1st. The third article is here given with the drawing to which reference is made in the text reproduced as Figure 1. For other illustrations pertaining to this subject refer back to pages 440 and 441 of last issue. Figure 2 on page 491 of this issue is the Figure 1 referred to in the article appearing in the May 1st issue. In the second article of the series, appearing April 15th, the first paragraph on page 390 should read, "In a series circuit the current is the same everywhere" in place of the text as it now stands.

POWER — LOSSES — EFFICIENCY

In stating the "power" of a motor we tell not only **how much** the machine can do but also **how quickly** it can do it. A single horse is able to haul an automobile to the top of a certain long hill, but it takes a 40 horsepower engine to perform the work in five minues. We have, then, two factors which determine the amount of power, the force required and the rate at which it drives the load.

In an electric circuit we have what corresponds to a force (the "voltage" or "pressure") and a quantity of electricity which is driven through the wires by this electromotive force. The rate at which the electricity is carried is indicated by the number of



The wattmeter—the reading depends upon both voltage and current.—Figure 1

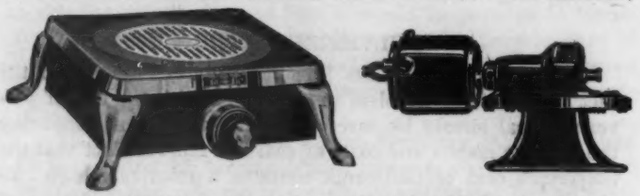
amperes of current, or "coulombs per second." Both the voltage and the current, then, are factors in the power necessary to force electricity around a circuit.

It has been agreed that the simplest practical unit of power would be that required to drive one ampere by a pressure of one volt. This unit is called the "watt" in honor of the man who gave the world its first notions of power. Then if one volt drives current at the rate of 3 amperes, the power is 3 watts. If it takes 2 volts to drive 3 amperes, the power is twice as much, or 6 watts. In general, the number of watts equals the product of the number of volts times the number of amperes.

This statement holds good in direct current circuits and in those alternating current circuits which include no coils, condensers or long parallel lines. With one or more of these, there are reactions which reduce the power requirement below the number of "volt-amperes." The following expression is correct in all cases:

Watts = volts × amperes × power factor,

where the "power factor" is equal to one or less, generally expressed as a percentage. It varies from 60% to 90% in most cases of alternating current motors and transformers, and is 100% for heaters,



WESTERN ELECTRIC HOT PLATE AND KLAXON HORN

Here are two devices for transforming electric energy into other forms—sound in the Klaxon horn and heat in the hot plate. The latter takes 4 amperes on a 220 volt circuit—how many British thermal units will it give out in an hour? If one-half of the heat escapes to the air, how hot will a gallon of water (8 lbs.) get in half an hour if its temperature is 60° when it is set upon the hot plate?

resistance boxes, incandescent lamps, etc., and for all direct current circuits.

Watts, Kilowatts and Horse Power.—The direct current load carried by an average power house may be 2000 amperes at 550 volts. The output of the machines, then, equals 550 × 2000 = 1,100,000 watts. This is too large a number to be handled conveniently, and it is customary in all such cases to use a larger unit, namely, the "kilowatt," which equals 1000 watts. Then the load above is expressed as 1100 kw. (kilowatts). The general formula is:

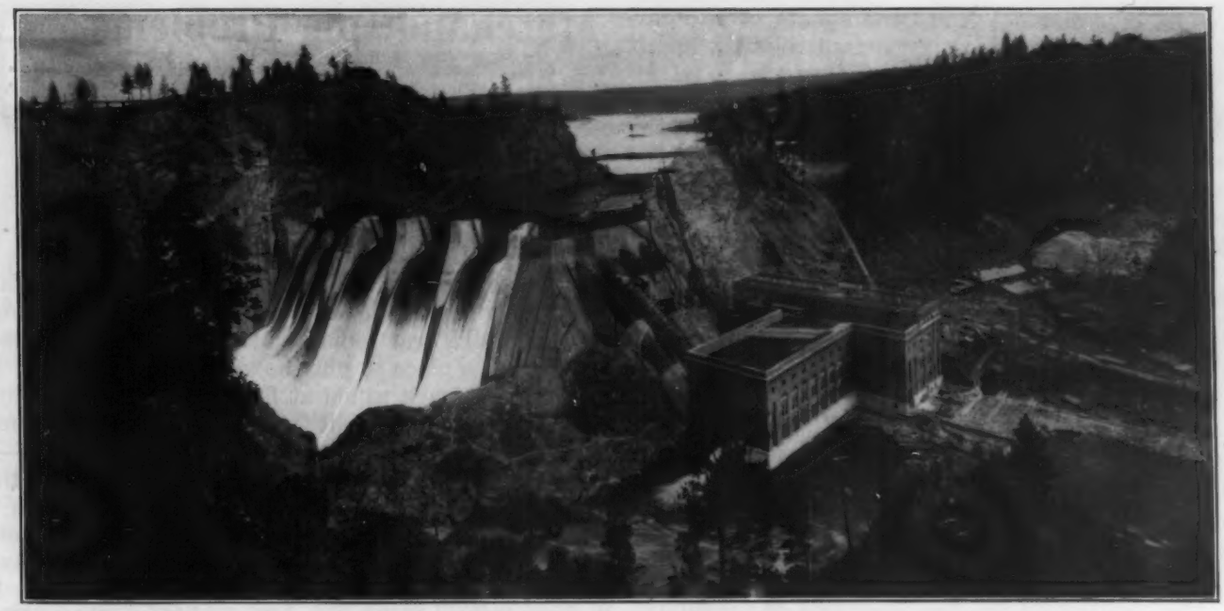
Kilowatts = volts × amperes × power factor ÷ 1000.

It is perfectly feasible to measure the power in electric circuits in terms of the "horse power," which was invented primarily for such machines as the steam engine. It has been established by calculation and measurement that one horsepower equals 746 watts, or approximately ¾ kw. Thus it is possible to transfer quantities from one system to the other with little difficulty:

20 hp. (horsepower) = ¾ of 20, or 15 kw., and
50 kw. = 4/3 of 50, or 66.7 hp. (approximately).

Power Measurement.—The horsepower output of a gas engine is conveniently measured mechanically by making it move a load. One horsepower is required to lift one pound at the rate of 550 feet per second, or to lift 550 lbs. one foot per second. For calculation,

Hp. = pounds pull × feet per second ÷ 550.



LONGLAKE DAM, WASHINGTON

Hydraulic energy is converted to electric energy in this power plant, situated near Spokane, Wash. The generators when they are all installed will give a combined output of 56,000 kw. If their efficiency averages 92%, what will the input be? What will then be the hydraulic horsepower received by the turbines, if their efficiency is 85%?

Electric power may be measured either by means of a wattmeter, connected as shown in Fig. 1, or by a combination of ammeter, voltmeter and power factor meter. The power factor meter is, of course, not used with circuits which are known to have 100% power factor. The wattmeter has both a "pressure coil" (terminals at P in Fig. 1) and a "current coil" (terminals at C), and their reaction upon each other determines the reading, which is thus proportional to both volts and amperes. On a.c. (alternating current) circuits the wattmeter is able to take account of power factor also.

INSIDE THE FARM HOUSE

This installation of an electric range and an electric water heater in a ranch home in California uses $6.00 worth of electric energy per month at a rate of 3 cents per kw-hr. What was the average current taken, if the apparatus was used on a 110 volt circuit 5 hours a day for 30 days?

Losses and Efficiency.—The voltage at the generator end of a short d.c. (direct current) transmission line is 250 volts. At the receiving end a voltmeter reads 230 and an ammeter reads 50. The voltage drop is then 20 volts. The power given the line by the generator $= 250 \times 50 = 12500$ watts or 12.5 kw. That delivered by the line $= 230 \times 50 =$ 11500 watts or 11.5 kw. There is a loss of power of one kw. which is used up in forcing the current through the wires.

Such a loss always occurs, and it results in heating the wires, just as the energy expended in moving a train changes to heat in the parts where there is friction.

It is possible to calculate the watt loss in a d.c. circuit by multiplying the voltage drop in the line by the current, as the watts in any part equal volts across that part times amperes. Thus in the example above we find $20 \times 50 = 1000$ watts. Furthermore, since the volt drop equals ohms $\times$ amperes, the watt loss $=$ ohms $\times$ amperes $\times$ amperes, or the

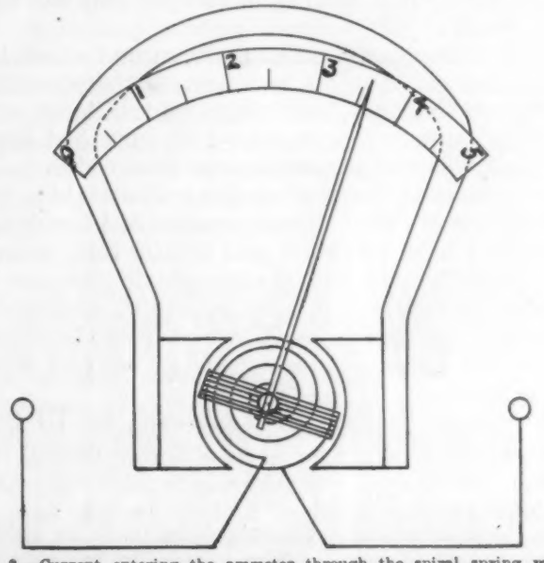


Fig. 2.—Current entering the ammeter through the spiral spring makes the coil and its iron core an electromagnet. This is the figure 1 referred to in the text of the article on electromagnets appearing in the May 1st issue.

product of resistance times the square of the current. This last is a most important relation, and it applies to all circuits, both d.c. and a.c.

When we speak of the "efficiency" of a transmission system we have in mind a comparison of the power delivered with power put into the line at the generating end. Strictly, the efficiency is the number found by dividing the "output" of the line by the "input." As an example, consider a system which

This is a hand magnet used in various ways such as the handling of hot castings, removing iron and steel from materials for making solder and recovering nails from sweepings.

delivers 9,000 kw., the current being 800 amperes and the total line resistance 3 ohms. The loss = $3 \times 800 \times 800 = 1{,}920{,}000$ watts, or 1,920 kw. The input to the line = 9,000 + 1,920 = 10,920 kw. Then the efficiency of transmission = 9,000 ÷ 10,920 = .824, which is 82.4%.

A mechanical machine, such as a waterwheel, may give out 40 h.p. while receiving 50 h.p. from the water. Its efficiency = 40 ÷ 50 = 80%. No machine has ever been made with efficiency as great as 100%, for some of the energy put in is always lost by friction. No transmission of electricity is 100% efficient, for energy is always converted into heat in overcoming resistance.

FIVE KNOWN KINDS OF ICE

There are, according to a recent article in the New York Sun, no fewer than five distinct kinds of ice. First, there is the common ice, which is water frozen at ordinary atmospheric pressure. This is called Ice I. It is from 10 to 13.5 per cent less dense than water.

If this is placed under a pressure of about 1000 kilograms the ice melts to water. If the pressure is increased to about 4400 kilograms the liquid water freezes again to another kind of ice called Ice V, which is about 6 per cent denser than water.

Increasing the pressure to about 6500 kilograms we get Ice IV, the volumic pressure and the density becoming from 5 to 9 per cent greater than water.

If we freeze water at atmospheric pressure, but with a temperature of —30 degrees C., ordinary ice (Ice I) is changed to Ice III, which is on the average 3 per cent denser than water and 20 per cent denser than Ice I.

Further increasing the pressure, Ice III turns into Ice II, which is about 22 per cent denser than Ice I. On further increasing the pressure Ice II changes to Ice IV and then to Ice V.

Sometimes these changes take place so quickly that a click is heard. The lower the temperature the more slowly is the change effected.

Merchandising Problems

(Notes from various field representatives of the California Electrical Cooperative Campaign—and one of the problems of the dealer in the larger city as met by the representative of the campaign in San Francisco and the bay region.—The Editor.)

WHERE WILL WE PUT THE WASHING MACHINE?

BY C. C. DAVIS

In discussing washing machines recently with the demonstrator of the Kimball Electric Company, of Oakland, it was remarked that it was a hard matter to find a place to put the washing machine.

This remark would at first seem ridiculous, but on a moment's thought there will be found much truth in it.

Building has taken rather a queer turn in the Bay region. The good old-fashioned cellar with a spacious laundry is seldom seen. The climate does not require such a place for storing foodstuffs, and as the grading and walling in is quite expensive, it has been discarded as a needless extravagance. The majority of the dwellings are of two stories, and built rather close to the ground, so have none of the advantages of the cottage with the high basement, so popular in other sections of the state.

The washing is usually done on the back porch, which is the essence of compactness; in fact, it is condensed to the limit. These back porches are heritages left the occupants by a penurious owner, a thoughtless architect and a cheap contractor. So the question, **"Where will we put the washing machine?"** is not so ridiculous after all.

The washing machine and the domestic sized mangler have come to stay, and provision must be made for them in all new homes. There must be provided floor space, electrical outlets for connecting up the various devices, and hoppers for suitable drainage.

Our electrical contractors and dealers can accomplish much in this regard, by a little missionary work. It means more sales of devices and more outlets.

CAMPAIGN FIELD NOTES

Gleaned from Reports of Field Representatives

Central California Electric Company.—Mr. Clyde Smith of Fresno has added the room next door to his attractive electrical store and is operating it as a washing machine store.

Selma Electric Company.—Mr. Limegrower has become greatly interested in the work of the Cooperative Campaign. He gave to Field Representative Brainerd his application for membership in the California Association of Electrical Contractors and Dealers.

A. R. Parsons, Porterville, reports that the cooperative appliance solicitor and the campaign in connection with his work in Tulare county have created a great interest in electrical appliances.

A. E. Holloway, San Diego Consolidated Gas & Electric Company, proposes to place in a frame in his company's office a card showing the names, addresses and telephone numbers of the electrical dealers in San Diego. Employes of the central station will then be able to easily and impartially refer consumers to this list.

SPARKS—Current Facts, Figures and Fancy

(Wireless concerts and long-distance lectures, a floating convention, and the startling achievements of a single grain of rice are some of the latest novelties presented here for the entertainment of the curious reader. You are also informed how you may eventually solve the servant problem, and of the risks you run when filling the gasoline tank of your automobile. —The Editor.)

The neutral countries have not escaped war prices. In Sweden the living expenses of a normal family have been increased by 142 per cent between 1914 and 1918.

* * *

It is estimated that one grain of rice sown will produce a harvest of fourteen thousand grains. The electric pumps used in the irrigation of California rice are an important support of this remarkable branch of agriculture.

* * *

In cases of shell shock and other nervous disorders occasioned by war, music has proved to be of incalculable benefit. The American Red Cross is making an appeal for musical instruments of every kind to supply this demand.

* * *

The postage stamp was officially adopted in 1847. In that year the total number of pieces of mail matter handled by the United States post office was 124,173,480. In 1913, which is the last estimate made, it was 18,567,445,160.

* * *

In connection with a zone-system of fares advocated in New Jersey, a pay-as-you-leave plan is suggested. Two cents is charged for the first mile, an additional cent for the second and so forth, each passenger receiving an identification zone slip on leaving.

* * *

Music by wireless is one of the recent achievements of the radio department of Rockwell field, the music of a Victrola aboard the "Marblehead" being transmitted to San Diego for an entertainment there. A similar delivery of music by telephone was one of the enjoyable features of the Coronado convention.

* * *

A new passenger air liner, constructed by a British company recently made its trial trip carrying twelve passengers, pilot and assistant. It attained an altitude of over six thousand feet in 7¼ minutes and an air speed of 125 miles an hour. It seems that air-travel will soon hold an important means as a means of passenger-transportation.

* * *

It has been ascertained by experiment that in the filling of gasoline tanks of motor vehicles there is danger of a static discharge of electricity, from tank metal hose or funnel used to transfer gasoline across the opening of the gasoline tank being filled. The gasoline passing through chamois stretched over the funnel will generate a charge great enough to cause a spark unless the funnel is kept in contact with another metal surface while the gasoline is being poured.

Electric street cars afford a striking contrast to the older methods not merely in speed but in cost of operation. The old horse tramways in London were worked at the rate of seventy-two cents a mile for two horses, this being chiefly due to the fact that the horses, bought at the age of five years, had to be sold at a loss after four years of work.

* * *

A foreign-trade convention held during a ten days' trans-Atlantic voyage is the newest departure in the commercial world. The convention however proved that it was not at sea in any other than the literal sense. It held regular formal sessions and accomplished as much in the way of progressive discussion as any gathering of the kind held on shore.

* * *

In England electrically treated wheat has been shown to produce 15 sacks per acre as against 12 sacks per acre of untreated wheat, the straw of the treated crop being one-fifth more than the untreated. A crop of treated barley yielded half as much again as the untreated. The process has also been tried with turnip, cabbage, tomato, cotton and other seeds, with good results.

* * *

Russia continues to surprise the world by reversing the recognized order of things. For instance, in the operation of railways, wages and salaries of workmen, line guards, clerks, etc., have been increased to such an extent that they are greater than the salaries of the superintendents and chiefs of the departments. It is said that this has increased the expenditures about 300 per cent.

* * *

According to some prophets the millennium is merely a question of electricity. Domestic servants, dishwashing, housecleaning, kitchen stoves and other laborious factors in daily life are to become obsolete, replaced by invisible magicians in the form of electrical devices. It is even threatened that concerts and lectures will be delivered to us in our own homes, and moving pictures projected there, from a central agency.

* * *

The Department of Chemistry at the University of California has made a number of valuable discoveries during the war. Coloring matters for dyes, oils, tanning materials and substitutes for rubber have been extracted in experiments with California trees and shrubs. Redwood stumps have been found to yield phenol from which many of the high explosives are made. Glycerine has been made from sugar instead of from fats as formerly, and tartaric acid from starch instead of grapes, both more inexpensive sources.

PERSONALS

A. Emory Wishon, assistant general manager of the San Joaquin Light & Power Corporation, was elected president of the Pacific Coast Section, N. E. L. A., for the coming year at the recent convention of that organization held in Coronado April 28 to May 2. Mr. Wishon has long been active in the association's interest and this appointment comes as a well deserved recognition of his services. His quiet energy and enthusiasm, so familiar to those who have worked with him in this and other lines of activity, have been devoted always to the upbuilding of the industry as a whole and the association looks forward to a year of active service under his guidance.

Max Thelen, formerly president of the California Railroad Commission and now director of public service of the U. S. Railroad Administration, has been spending some time on the Pacific Coast. Mr. Thelen has taken up matters of local adjustment such as the handling of freight traffic and has also had occasion to address various gatherings of importance on the present railroad situation. He spent some days in San Francisco and since has gone to Salt Lake City.

W. C. Gill, a prominent contractor-dealer of Reno, Nev., was a recent San Francisco visitor.

H. F. Schultz, salesman for the Electric Appliance Company, is going out into southern territory.

W. V. Banister, who is connected with Stone and Webster interests at Long Beach, Cal., was a recent San Francisco visitor.

E. B. Strong, president of the Technical Publishing Company, has recently returned to San Francisco from a several months' trip throughout the East.

R. H. Ballard, vice-president of the Southern California Edison Company, is attending the N. E. L. A. convention at Atlantic City.

M. V. Watson, manager of the Arizona Power Company from Prescott, Arizona, is reported as in attendance at the joint conventions at Coronado.

T. E. Bibbins, president of the Pacific States Electric Company, has gone East to attend the Atlantic City convention and will touch at other points en route.

L. J. Bergman of Pass & Seymour, Syracuse, N. Y., was among the welcome guests from that far distant city in attendance at the recent gathering in Coronado.

Frank Boyd, local manager of the small motors department at San Francisco, stopped off at the Coronado conventions on his way back from a recent eastern trip.

C. B. McCullough, head of the civil engineering department of the Oregon Agricultural College, has accepted the position of state highway bridge engineer of Oregon.

G. F. Kirkpatrick, salesman for the Pacific States Electric Company with headquarters at Seattle, has returned to Seattle after two weeks spent in the Spokane territory.

Lieut. R. T. Strong, of the U. S. S. Marblehead, has recently received his discharge from the service. He will spend a few weeks in San Diego before returning to his home in Portland.

J. F. NePage of NePage, McKenny Company, electrical engineers and contractors, Armour Building, Seattle, visited the Portland offices of the company recently on business.

D. R. Bullen, manager of the supply department of the General Electric Company from Schenectady, N. Y., brought greetings from the East to the joint conventions at Coronado.

N. R. Stansel of the Southwest General Electric Company of El Paso recently made the trip to California to attend the Pacific Coast N. E. L. A. convention at Coronado.

H. L. Aller, general manager of the Pacific Gas & Electric Company of Phoenix, Arizona, was one of those in attendance at the recent Pacific Coast Section, N. E. L. A. convention.

F. D. Schwartz, western manager of the Indiana Rubber and Insulated Wire Company of Jonesboro, Indiana, is a recent Pacific Coast visitor. Mr. Schwartz' headquarters are in Chicago, Ill.

W. R. Elliot of the Salt River Valley Water Users' Association is a recent visitor to California, where he took in the Coronado convention of Pacific Coast electrical men held April 28 to May 2.

W. W. Mumma of the Myers & Robbins Company from Springfield, Ohio, has been spending some time in California —part of it at the Coronado convention which was the feature the first of the month.

J. R. Lovejoy, vice-president of the General Electric Company of Schenectady, and **J. A. Cranston,** Northwest manager of the company with headquarters in Portland, recently spent some days in San Francisco.

E. B. Snyder of the Ohio Brass Company of Mansfield, Ohio, has been visiting the Western coast in the interest of his company. He was among those present at the recent convention in Southern California.

A. L. McCarthy, vice-president and general manager of the Eureka Vacuum Cleaner Company of Detroit, plans to make a trip to the Pacific Coast in June with the object of establishing sales sections in the West.

W. Brewster Hall, of Pass & Seymour, Syracuse, N. Y., was in attendance at the Coronado conventions, where he seemed to have fully recovered from his recent accident in Portland. No crutches were in evidence.

W. R. Putnam, prior to his leaving for Boise, Idaho, to become vice-president and general manager of the Idaho Power Company, was tendered a farewell banquet by the entire electrical fraternity of Salt Lake City, on April 28th. About 150 men representing all branches of the electrical industry were present.

A. L. Kempster, manager of the Seattle division of the Puget Sound Traction Light & Power Company, an expert street railway man, has gone to New York City, where he has been called to assist in the solution of transportation problems of the Interborough Rapid Transit System. The Interborough Consolidated Corporation, which is the largest city transportation company in the United States, was placed in the hands of a receiver on March 21st, 1919, by the United States District Court. The interborough companies operate the elevated, surface and subway lines of the city and control the Interborough Rapid Transit Company and the New York Railways. Mr. Kempster's long experience in the street railway business and expert knowledge brought him the appointment.

H. L. Garbutt, formerly manager of the line materials section of the supply department of the Westinghouse Electric & Manufacturing Company, has recently been made local supply manager of that company in San Francisco.

O. B. Moorhead of San Francisco, president of the Moorhead Laboratories, Inc., made a recent trip to Seattle to attend the annual meeting of the corporation, which is incorporated under the laws of the state of Washington.

R. C. W. Libbey of the Simplex Electric Heating Company of Cambridge, Mass., has recently been visiting the Pacific Coast. While here he attended the Pacific Coast Section, N. E. L. A. convention and made and greeted many friends.

A. P. Merrill, formerly division manager for the Utah Power & Light Company, at Provo, has been promoted to fill the position of manager of the Ogden division for the same company, succeeding P. M. Parry, recently appointed commercial manager.

Stacy Hamilton and **C. P. Osborne** represented the Northwest Power Association at Coronado in the friendly exchange of interest which has played such a pleasant part in the relationship of this society with the Pacific Coast Section, N. E. L. A.

E. O. Shreve, San Francisco manager, and **John Hood,** San Francisco engineer with the General Electric Company, went East immediately after convention to look into new industrial developments in that region and to visit headquarters at Schenectady.

A. D. Page of the Harrison, N. J., Edison Lamp Works represented New Jersey at the Coronado gathering. There were twelve states other than California represented at the convention—one of the features which gave the particular charm to that event.

Colonel H. C. Sparks, C. M. G., member of the Council of the British Institute of Electrical Engineers with headquarters in London, is a recent San Francisco visitor en route home to England. Colonel Sparks is at present investigating the uses of pulverized coal.

R. C. Starr, formerly with Stone & Webster Company, in charge of construction work on the Big Creek installation of the Southern California Edison Company, has been made chief construction engineer for the new installation work of the San Joaquin Light & Power Corporation.

C. E. Wiggin, who addressed the Electrical Credit Association of the Pacific Coast at their recent dinner in San Francisco, should have been credited in the last issue with being head of the electric department of Dunham, Carrigan & Hayden, in place of the credit department.

E. M. Cutting of the Edison Storage Battery Company, and Mrs. Cutting, were among those feted at the recent Coronado conventions. Ed. Cutting was a familiar figure to the industry, but this was Mrs. Cutting's first convention, she not having been Mrs. Cutting for any great length of time.

Capt. R. W. A. Brewer, who as inspector for the British government stationed in Stockton and later in San Francisco, made so many friends on the Pacific Coast, has definitely decided to remain in this vicinity and has opened offices in San Francisco as a consulting engineer and technical adviser.

Henry Bostwick of the Pacific Gas & Electric Company, and **Robert Sibley,** editor of the Journal of Electricity, composed the resolutions committee of the recent Coronado conventions. Mr. Sibley was removed from the committee, however, before the resolution thanking the Journal of Electricity was suggested by the president.

John R. Brownell, formerly safety engineer with the California Industrial Accident Commission, has resigned to take charge of group and business insurance for the Equitable Life Assurance Company of New York, with headquarters in San Francisco. **Hugh M. Wolflin** takes Mr. Brownell's position with the accident commission.

E. Parry, formerly Chief Electrical Engineer to the state of New Zealand, is now on the way to London to take the position of Engineer in Chief to the English Electric Company, a new combination of some half-dozen existing engineering firms. His successor in New Zealand is Lawrence Birks, now located in Wellington.

H. Etchells, a co-inventor of the Greaves and Etchells electric furnace with headquarters in Philadelphia, is a recent Pacific Coast visitor. While in the San Francisco district Mr. Etchells visited the recent six ton three phase electric furnace that his company, the Electric Furnace Construction Company, has recently installed at the Mare Island Navy Yard.

C. F. Elwell, formerly connected with the Federal Wireless Company of San Francisco, who went to Europe five years ago in connection with his work and has been erecting wireless stations in France and England, has recently been decorated with the Cross of the Crown and made a cavalier by the king of Italy. This is in recognition of his services to Italy during the war. Elwell is a graduate of Stanford University.

C. E. Grunsky, well known consulting engineer of San Francisco, has recently returned from a business trip to New York, Washington and Chicago. While in Chicago Mr. Grunsky attended the conference of engineering societies for the discussion of the Department of Public Works as delegate of the Society of Pacific Coast Consulting Engineers and was active in the formulation of the policies in favor of such a department passed by the convention.

D. W. Cole, manager of the Boise project, the largest irrigation project in the United States, has been succeeded by **J. B. Bond** of Klamath Falls, Ore., who was in charge of the Malheur project in Oregon and is a prominent reclamation service engineer. **C. C. Fisher,** assistant manager, has been assigned work on a new project and has severed his connection with the Boise project. **C. E. MacClain,** former watermaster, has been made superintendent of irrigation.

Benjamin G. Lamme, chief engineer of the Westinghouse Electric Company, has been chosen to receive the Edison Medal at the annual meeting of the A. I. E. E. held on May 16, 1919, "for meritorious achievement in electrical science." In 1915 Mr. Lamme was, upon nomination by the American Institute of Electrical Enginers, appointed by the Secretary of the Navy to membership on the Naval Consulting Board, and his services as a member of the Board during the war have been of great value to the country.

Major John L. Retallack has been appointed by the government of British Columbia to be public utilities commissioner for the province under the new public utilities act. Major Retallack has just recently returned from overseas where he served as quartermaster of the 48th battalion and later as transport officer in the railway corps. He is a mining engineer and a member of the Canadian Mining Institute. His appointment follows the recent resignation of R. H. Gale, mayor of Vancouver, who had originally been appointed to the position by the lieutenant-governor.

OBITUARY

Hermann Schussler, for fifty years engineer of the Spring Valley Water Company, designer of many notable hydraulic works in the West and Hawaii, and one of the well known hydraulic experts of the United States, died of heart failure recently at his home in San Francisco. Mr. Schussler designed and constructed the entire system of works of the Spring Valley Company. In his private practice, which he carried on at the same time, he designed and constructed the Lagunitas dam for the Marin Water Company; a seven-mile inverted siphon for the Virginia City Water Company, the pioneer high-pressure line, and many other notable engineering feats in the West.

Meeting Notices for Electrical Men

(The historic Coronado convention was the main event of the past two weeks period. Closely following this came the gathering of Westinghouse Agent-Jobbers at Del Monte. In Chicago on April 23 the first step toward a National Department of Public Works was taken. Other meetings of local interest are further recorded below.—The Editor.)

Engineering Conference

A conference of engineering societies called by the Engineering Council met at Chicago, April 23 to 25, M. O. Leighton, chairman of the National Service Committee, presiding. The gathering was for the purpose of discussing the establishment of a national Department of Public Works and outlining a program for bringing this about.

The conference was attended by some seventy accredited delegates, seven members of the Engineering Council and two members of the National Service Committee. In addition to these, representatives of engineering organizations from all parts of the country and of the Architects and Chemists were present. All discussions were conducted with open doors.

The desirability of coordinating the engineering and related government activities in a single department was expressed by a large number of delegates from all sections of the country and from all branches of the profession. This sentiment was embodied in resolutions which were carried unanimously by the assemblage.

Following this the conference took up in turn the various bureaus, services and commissions in which engineering activities predominate or are notable, with a view to ascertaining the general consensus of opinion as to which should be placed in a Department of Public Works. A committee was charged with this consideration and on the second day made a report which was unanimously adopted after slight amendment.

In considering a proposed campaign of education to bring about the establishment of a Department of Public Works, several delegates who were in a position to speak authoritatively assured the Conference of the vigorous support of the various technical publications in the conducting of such a campaign.

A campaign committee was named, in addition to an executive committee and a committee to prepare the text of a bill.

After disposing of the main question, the Conference considered the functions of the Engineering Council and the relation which should be established between the Council and engineering organizations other than the four founder societies originally represented. The need for representation of all engineering organizations, whether national in scope or not, was referred to by most of the speakers on the subject. The desirability of concerted action by the profession was strongly emphasized, and the Conference was cited as an illustration of the need of some sort of federation of engineering organizations.

Synchronous Club of Los Angeles

The annual "Synchronizing" of the Associate Members of the Synchronous Club, preceded by the annual banquet, was held on April 29th. Owing to the absence of Ex-President R. H. Cates, W. S. Houseworth took charge and stage-managed the entertainment.

The regular open meeting of the society, held on May 13, was addressed by J. A. Lighthipe, chief electrical engineer of the Southern California Edison Company. His subject was "Early Stages of Electrical Development."

San Francisco Section, A. I. E. E.

The latest meeting of the committee on Railway Electrification was held at the San Francisco Engineers' Club on May 14. The special subject of the meeting was a discussion of "The Scope of the Committee's Work."

Chamber of Commerce of the United States

The seventieth annual meeting of the Chamber of Commerce was held at St. Louis April 28 to May 1. The subjects taken up included the League of Nations; anti-trust legislation; foreign relations and foreign trade; the disposition and operation of the railroads; the merchant marine, and industrial production and distribution.

Oregon Association Electrical Contractors and Dealers

The regular meeting of District No. 1 was held on April 21. The following were unanimously elected to membership; Sellwood Electric Company, J. R. Davidson of Portland and the Welch Electric Company of Salem.

Mr. Finnegan and Mr. Green plan to go to Salem to confer with state authorities on the subject of separate specifications for state electrical and plumbing work.

California Association of Electrical Contractors and Dealers

A meeting of the Executive Committee was held in San Francisco on March 10, President M. A. DeLew in the chair.

The following applications for membership were unanimously accepted: Werry, Palo Alto; Stanford Electric Works, Palo Alto; Knight and Miller, Modesto; Chas. Eyman, Madera; Bright Spot Electric Company, Stockton; E. S. Abbott, Tracy.

A motion was carried that subscriptions to the "Electrical Contractor-Dealer," "Electrical Merchandising" and the "Journal of Electricity" be taken out.

Monterey Bay Section, California Electrical Contractors and Dealers

The members of the California State Association, Monterey Bay Section, are arranging for a solicitation campaign,

BUILDERS OF THE WEST—LIII.

HENRY MORSE STEPHENS*

Not only in the classic halls of learning but in the business and professional life of the West has the life-work of Henry Morse Stephens, head of the history department at the University of California—friend and counsellor of the first magnitude—had a loving and profound influence over the lives of our citizens. As a molder of character, as a guide who pointed the way through the example of history to the better building of the future, he richly deserved the title of Builder. To Henry Morse Stephens, with loving memory, this issue is affectionately dedicated.

*It was with sincere regret that we learned that the sudden death of Prof. Stephens had prevented our paying him this tribute during his lifetime. Prof. Stephens had made an appointment to sit for his picture for this series just prior to the time when he was stricken with heart failure.

SOME OF THE PROMINENT PEOPLE AT THE CORONADO CONVENTIONS

Over five hundred men from all branches of the electrical industry attended the joint conventions of the California Association of Electrical Contractors and Dealers, Pacific Coast Division Electrical Supply Jobbers and Pacific Coast Section N. E. L. A. at Coronado. Seated in the front row, reading from left to right, are: H. F. Jackson, former president of the Pacific Coast Section, N. E. L. A.; J. B. Black of the papers committee, T. E. Bibbins, president of the Pacific Division, Electrical Supply Jobbers; Samuel Kahn, president of the Pacific Coast Section, N. E. L. A.; Henry Bostwick of the executive committee; A. E. Wishon, newly elected president and A. B. West, K. E. Van Kuran, H. L. Allen, Frank Somers and D. E. Harris, all of the executive committee, Pacific Coast Section N. E. L. A.; M. A. DeLew, president of the California Association of Electrical Contractors and Dealers; John A. Britton, chairman of the public policy committee; S. M. Kennedy, author of the "surprise" paper of the convention; L. S. Ready of the California Railroad Commission; H. H. Jones, chairman of convention, and W. L. Frost, chairman of the entertainment committee.

and it is anticipated several solicitors will be put out in the territory in the very near future. Close cooperation is enjoyed with the central station of the territory—the Coast Counties Gas and Electric—their genial local manager at Santa Cruz, Mr. Cardiff, giving his assurance of every support to help the work along. The electric range will be one of the home appliances to be featured.

At a most enthusiastically attended meeting of the Section recently held at Watsonville, at which the wives of the members attended, details of the campaign were finally decided upon, it being the purpose to cover Santa Cruz, Watsonville, Monterey, Hollister, Salinas and the intervening territory for a period of at least a year, by which time it is anticipated that the results obtained not only by direct sales, but through the publicity given to the uses and advantages of electrical appliances in the home will warrant the permanent continuance of the plan.

A. I. E. E., San Francisco

On May 23rd the San Francisco Section of the A. I. E. E. will visit Palo Alto and go through the factory of the Federal Telegraph Company. Dr. Leonard F. Fuller will give a talk at the factory entitled "Recent Developments in Long Distance Telegraphy—an Illustrated Description of the Stations Used in the Transatlantic, Transcontinental and Transpacific Radio-Circuit," with a demonstration of high voltage, high frequency phenomena.

The Del Monte Convention of Westinghouse Agent-Jobbers

The great convention comprising representatives of the Westinghouse agent-jobbers from all parts of the nation, as previously described in the columns of the Journal of Electricity on page 401, April 15, 1919, and on page 450, May 1, 1919, has been held. The convention was a complete success in every sense of the word. Not only were the papers of high order but the broad discussion on problems of vital interest to the industry as a whole as brought out at the Del Monte gathering will be reflected in all branches of the industry in raising the ideals of the industry to higher standards of attainment.

The splendid talks of W. C. Free on salesmanship, of T. Julian McGill on bettering the employe situation, of Walter Cary on laying the cards on the table, or in other words increasing the frankness of expression when putting up a business proposition even in the presence of competitors, and of W. L. Goodwin, founder of the well-known Goodwin Plan, will stand out in helpfulness for many months to come.

At the concluding session on Friday F. E. Stow, of Philadelphia, was elected to succeed J. C. Schmidtbauer as president of the Westinghouse Agent-Jobbers' Association, and Hot Springs, Va., was chosen as the meeting place for the next annual gathering.

PACIFIC COAST SECTION, ELECTRICAL SUPPLY JOBBERS

The jobbers' sessions, held as part of the joint conventions at Coronado on the first two days of the week, included papers by D. C. Pence, Illinois Electric Company, on "Competition Based on Vindictiveness"; W. S. Berry, Western Electric Company, on "Service on Returned Goods," and H. L. Harper, Western Electric Company, on "Relations Between Contractor, Jobber and Manufacturer."

JOBBERS HAVE ANNUAL PLAY FOR GOLF CUPS

Tuesday afternoon the possession for the ensuing year of the highly valued golf trophies of the Electrical Supply Jobbers' Association was determined after many spirited contests. The much beloved Old Copper Cup and the Pass and Seymour Cup went to H. D. Randall of Salt Lake City. The Turner Trophy was captured by C. C. Hillis of San Francisco, and Frank Fagan of San Francisco won the honor of possession of the cup presented to the Jobbers by the Manufacturers. The presentations were made at the joint banquet of Jobbers and Manufacturers that evening, which was presided over by F. N. Averill.

HELPFUL SESSIONS OF THE CONTRACTOR-DEALERS

Considerable interest was centered in the Contractor-Dealer sessions of the convention. The past six months' work of the Association was reviewed in Executive Committee session held on Tuesday while at the Wednesday session the work of and results obtained from the California Co-operative Campaign efforts were considered. The testimony given by the dealers present was of a most enthusiastic and encouraging nature. It is hoped to enter upon still more extended efforts during the coming year.

Notwithstanding the fact that the convention this year is located at a considerable distance from a large number of the contractors and dealers of the state, yet the large representation of this branch of the electrical industry at the meeting testifies to the intense interest and earnestness with which the electrical contractor-dealer has entered into the new era of electrical development on the Pacific Coast.

UTAH SOCIETY OF ENGINEERS

The regular meeting of the Utah Society of Engineers was held April 23. Papers were presented on different phases of sugar refining, which is such an important industry in the inter-mountain country. The principal subjects were "Mechan-

ical Operation of Factory," "Process and Chemical Control," "Polariscope," "Design of Factory," "Agricultural Problems" and "Bi-Products."

Electric Luncheon

The Electric Section of the Chamber of Commerce held a luncheon at the Hotel Oakland on May 8th. The opening address was given by Arthur Halloran of the Journal of Electricity on "Practical Results of the Convention at Coronado." Other speakers of the occasion were Frank E. Boyd of the General Electric Company, Dave Harris of the Pacific States Electric Company, R. C. W. Libbey of Cambridge, Mass., and George N. Rooker of the Western States Gas & Electric Company, Richmond.

WESTERN MEETINGS

Home Industry League —

May 1—Joint conference-luncheon at Palace Hotel. Lewis F. Byington—"Support California."

National Electric Light Association, Portland Section —

May 6—George E. Quinan—"National Electric Safety Code."

Jovian Electric League, Los Angeles —

April 30—No meeting on account of the N. E. L. A. convention.

Foreign Trade Club —

April 23—Robert Sibley—"Foreign Trade from an Engineer's Viewpoint."

A. I. E. E., Seattle Section —

May 20—L. T. Merwin—"Novel Features of a High Pressure Steam Distribution System Recently Installed at Portland."

THE "NEW SPIRIT OF LIGHTING" AT THE N. E. L. A. CONVENTION

An interesting feature is being planned for the coming convention of the National Electric Light Association at Atlantic City for the purpose of expressing to the industry what has been called "The New Spirit of Lighting." Through the N. E. L. A. Lamp Committee with the cooperation of the Lighting Sales Bureau of the Commercial Section and lamp manufacturers, these more interesting aspects of modern lighting are to be presented in the form of a special exhibit to occupy a conspicuous position in the exhibition hall at the convention.

This special lighting exhibit will be composed of ten separate booths or sections, the outstanding features of which will be very elaborate presentations of industrial, store, window and home lighting. The industrial lighting exhibit, for instance, will be a typical modern machine shop with machinery representing several classes of industry installed and running. Illumination will be provided by three systems of lighting. One will show the too prevalent scale of poor lighting, another a good standard of illumination and a third will present what is considered the best productive intensity.

For the purpose of demonstrating the best modern standards of show-window illumination, a life-size show-window will be installed in which there will be a practical display of merchandise. It is expected that this display will be changed daily during the convention under the guidance of some prominent Atlantic City or Philadelphia department store. This show-window will be equipped with 15 different systems of show-window lighting, demonstrating different intensities of illumination from different directions.

There will be another space devoted to home lighting which will comprise a number of typical rooms, characteristic of a modern priced dwelling such as represents in large measure the home lighting problem of the day. These rooms will be illuminated by a very flexible system of lighting which will enable the operator to demonstrate the advantages of different types of fixtures and different ideas in the arrangement and location of lighting outlets. There will be a variety of portable lamps in use, not as an exhibition of the lamps themselves, but merely incidental to the illumination.

Then there will be other sections given up to the display of indoor lighting equipment and outdoor lighting equipment. There will be a room devoted to the newer applications of lighting, such as the moving picture field and the use of projector lighting. There will be a room given up to central station lamp practice, illustrating the report of the lamp committee on the standardization of voltage, recent experience in the merchandising of lamps and other data showing what control stations are doing in the lighting field in different cities. In another section will be gathered together the educational literature available at present on lighting subjects. Here will be files giving a key to the different items of equipment featured in the different parts of the exhibition, standard and special equipment now in use in varying phases of lighting prospects and other general information.

The foyer of the lighting exhibit will be attractively furnished as a rest room and entirely illuminated by portable lamps. At the end of the foyer will be a moving picture screen where a large number of exceedingly interesting films, both on lighting and other electrical subjects, will be shown.

CALIFORNIA CONTRACTOR-DEALER NOTES

Gould the Light Man, at Stockton, Cal., has just moved into a finely equipped new store in the shopping district in Stockton.

E. B. Anderson, of Coalinga, Cal., has just moved into a fine retail establishment, and is opening a fully equipped retailing business.

Henry Fenneman, of the United Electric Company, at Taft, Cal., was a recent visitor to San Francisco.

Lawrence Scott, formerly with the Mt. Whitney Power Company, has recently bought a half interest in the Chaffee Electric Company at Visalia, Cal.

The Nutt Brothers, proprietors of the E. M. & M. Service, Lindsay and Exeter, were recent visitors at San Francisco in connection with matters affecting their new and progressive establishment at Lindsay.

R. E. Mixer, of the General Electric Company, San Francisco, is to leave that company, having accepted the position of manager for the Turner Electric Company, recently opened at Modesto, Cal.

E. E. Brown of San Francisco has entered the electrical contracting business for himself in that city. The new firm will be known as Brown & Langlais.

The Greeneps, of Hollister, have taken over a new store location which will be devoted exclusively to the electrical business, both contracting and retail, and will be conducted by Greenep, Jr., who has recently returned from the war.

The Los Banos Electric Shop has recently been opened at Los Banos, Cal. R. G. Murphy is the proprietor.

The Central States Electric Company at Fresno have recently expanded their place of business, taking in the store next door, which will be devoted to the selling of washing machines and vacuum cleaners.

The Noggle Electric Company, of Monterey, Cal., has entered the automobile field, having taken over the agency for the Nash car.

The Bright Spot Electric Company has recently entered the field in Stockton. W. A. Murphy and G. A. Marengo are the proprietors.

The Star Electric Company at Bakersfield, Cal., has recently moved from East Bakersfield into a very attractive location in Bakersfield proper.

The Sullivan Electric Company of Modesto has recently opened for business in an attractively equipped store.

HAPPENINGS IN THE INDUSTRY

ELECTRIC POWER IN JAPAN

The following figures concerning the electrical industry in Japan are returned by the Department of Communications: Number of power companies, 623; electric railways, 42; power and railway, 48; total, 713. These figures, which were compiled at the end of October, 1918, show an increase of 43 over those of September, 1917. The total working power is 1,073,445 kw.—an increase of 154,085 kw. over the preceding year.

ELECTRICAL DEVELOPMENT IN ENGLAND

A campaign similar to that conducted in the United States by the Society for Electrical Development is now being inaugurated by the British government, for the purpose of popularizing the use of electricity. The Society has been asked to furnish the British authorities with copies of its material.

CHICAGO ELECTRICAL SHOW

An Electrical Show and Exhibition called the "Chicago Electrical Show" will be conducted by the Electrical Trades Exhibition Company at the Coliseum, from October 11th to 25th inclusive. The exhibition, of which E. W. Lloyd is manager, is designed to stimulate electrical business by a display of appliances and apparatus. The last Show was held in 1911.

IDAHO ENGINEERS TO BE LICENSED

During its recent session the Idaho legislature passed House Bill 209 for licensing civil engineers. The act came into effect May 1, 1919, and provides for examination and registration of all applicants to practice civil engineering.

TRANSMISSION LINE TO CONNECT TWO ARIZONA SYSTEMS

A transmission line seventy miles long is to be constructed to connect the generating stations of the Pacific Gas & Electric Company of Phoenix, Arizona, and the Arizona Power Company of Prescott. G. H. Wallbridge is president of the Pacific Gas & Electric Company of Arizona, while the vice-president, F. S. Biele, is also president of the Arizona Power Company.

The demand for power in the district has increased, and it is expected that additional power facilities will hasten development. The Pacific Gas & Electric Company obtains its power chiefly through the Salt River Valley Water Users' Association from the Roosevelt Dam. A large additional supply of cheap power which is not obtainable from this source will be furnished by connection with the Arizona Power Company.

TRADE NOTES

Bellingham Coal Mine —

The Puget Sound Traction Light and Power Company at Bellingham, Wash., is extending a 6500 volt line from its main power line to the new Bellingham coal mine just beyond the city limits. The mine is the property of John C. Eden and associates of Seattle.

A power hoist is being erected, and an electric locomotive will be used for hauling and dumping the coal. It is understood also that as the mine is but a mile and a half from the water front and considerable pumping may be necessary, electric pumps will probably be installed to deal with the surplus water.

Moved to New Quarters —

The Electric Motor and Machine Company of San Francisco has recently moved to 407 Stockton street, where it has a duplex store, one side for merchandising of appliances and the other for motors and repairs.

Electrical Installations at Everett, Washington —

A five-way shipyard is being constructed at Everett, Washington, by the Norway Pacific Construction and Dry Dock Company, with electrical equipment which will give the company a connected load of 3000 kilowatts. The power is delivered by Stone and Webster.

A motor generator set is being installed for producing direct current to operate electric cranes in the shipyards. The wiring of all buildings was done in metal conduit providing for high-power tungsten lamps in buildings and yards, with special lighting for each individual machine.

Expansion Program —

Rathbone, Sard and Company, one of the oldest stove and range manufacturers of the country, have recently opened branch offices in San Francisco, Portland, Los Angeles and Salt Lake City. At each of these points warehouse service is maintained, and complete and ample stock carried ready for immediate shipment on dealers' orders.

The company is starting a vigorous selling campaign to increase its sales of electric ranges, especially in the coast and mountain states where low current rates prevail.

The organization in the West is directed by C. F. Jaques, district sales manager, who has his headquarters at the Portland branch and supervises the work of the other western branches. The San Francisco branch is in charge of M. S. Barnett, the Los Angeles branch of M. M. Merritt, and the Salt Lake City branch of M. C. Bennett.

Electrification in Southern Oregon —

The Buck box factory of Eugene, Oregon, is moving to Reedsport, and has contracted with the Marshfield Electric Company for some 100 horsepower motors to operate the new plant. The Marshfield company will also install an electric plant at Reedsport for the Reedsport Light and Power Company and will put in the distributing system.

The Johnson mill at Coquille is installing two 75 horsepower motors, and one smaller one, and the Oregon Export Lumber Company is putting in an electric hoist at the Southern Pacific docks. Julius Kruse is electrifying his ranch near Coos City, installing a motor to operate his milking machine and wiring his house and barns.

New Offices —

The Van Dorn & Dutton Company of Cleveland, Ohio, manufacturers of gears, have opened branch offices at New York and Chicago, where their purpose is to specialize in gears and pinions for electrical work. Harry F. Keegan will manage the Chicago branch, and his brother, John Keegan, the one at New York.

New Plant at Louisville —

The Ignition Plug Company of Dayton has located its plant in Louisville. The officers of the company are E. R. Stucky, president; H. C. Smith, vice-president; C. D. Rodman, vice-president; W. T. O'Neal, secretary and treasurer; A. C. Reager, assistant secretary. The company has representatives in the principal cities of Indiana, Illinois and Kentucky. It will manufacture a spark plug known as the "Tipco."

New Business —

The Standard Electric Company, 73 Horton street, Seattle, recently wired the auxiliary schooner Hamilton, built at the McAteer shipyards; the auxiliary schooner Snetind, built by the Price Shipbuilding Company near Ballard, and a large crane for the Puget Sound Machinery Depot.

Change of Address —

The Booth-Hall Company, designers and builders of electric furnaces, announce the removal of their executive and sales offices to Rooms 1007-1008, Hearst Building, 326 West Madison street, Chicago.

G-E Employes in Parade —

Thirty-one women employes of the General Electric Company offices in San Francisco took part in the Welcome Home parade on April 22, one girl for each of the thirty-one

stars in the company's service flag. The names of the boys were put in envelopes and the girls drew to see for which particular one each would march. The effective result as a feature of the parade is shown above.

Brazil Railway to Install Electric Furnace —

The Central Railway of Brazil reports its intention of installing in its workshops an electric furnace for the smelting of ferro-manganese.

New Company —

The China Electricity Company is a new concern being organized by the Sino-Japanese Industrial Company and the China Industrial Development Association to combine the Japanese firms in China dealing in electrical goods.

American Bank in the Orient —

The Asia Banking Corporation, the second American banking institution to be established in the Orient, opened its offices in Shanghai on February 7. The new bank will carry on business with an American staff.

New Connection —

Max Loewenthal, formerly manager of the appliance department of the Panama Lamp & Commercial Company, announces that he has severed his connection with that company and beginning with May 1, 1919, will conduct an organization under the name of the Globe Commercial Company, with offices at San Francisco. The new firm represents the "Menominee" Electrical Products, "Pittsburgh" Electric Specialties, "Russell" Hold Heat Appliances, "America" Vacuum Cleaners, "Haag" Washing Machines, "Domestic" Electric Steam Washers, "Ostrander" Sockets, Shades, etc., "Sadnard" National Line of Switches, "Empire" Bell and Toy Transformers, "Wells" Motor Starting Switches, "Globe" and "Waage" Electric Irons, "Red Top" Toasters and Iron Plugs, as well as automobile specialties, spotlights, timers, etc.

THE ELECTRICAL SUPPLY JOBBERS' PUBLICITY CAMPAIGN

An Open Letter from the Electrical Supply Jobbers' Association

At the meeting of the Electrical Supply Jobbers' Association held at Hot Springs, Va., May 22-23, 1918, a Publicity Committee was appointed to make an investigation of the means to be employed and the expense involved in conducting a campaign of publicity, the purpose of which would be to set before the trade certain facts concerning the nature of the business and the purpose and work of the association.

The Publicity Committee, composed of A. M. Little, president of the Mohawk Electrical Supply Company, Syracuse, N. Y., chairman; F. R. Elliott, president of the Elliott-Lewis Electrical Company, Inc., Philadelphia, and F. D. Van Winkle, president of the Post-Glover Electric Company, Cincinnati, Ohio, presented its report at the Cleveland, Ohio, meeting of the Association, December 9, 10, 11, 1918, and an appropriation of $12,000 was voted for the committee to continue its work.

Subsequently, arrangements were made to lay out a plan which includes the use of advertisements in electrical journals, reprints of these advertisements for mailing by the members of the Association, booklets describing the campaign for the use of members and members' salesmen, booklets for distribution to the trade, a prize contest for the best essay on jobber distribution, from the central station and contractor-dealer standpoint, with suitable and generous compensation for the winner, conference and correspondence with the editors of the electrical journals and an exchange of experience, ideas and suggestions with other associations in the industry, and with other associations of jobbers.

In connection with the use of the electrical journals it was decided to spend approximately $8,000 for advertising space out of the total of $12,000 available. The schedule includes a total of 108 pages of advertising in the papers selected, not less than 9 pages in any one month, as many as 13 pages in one month and including 6 double-page spreads.

The publicity campaign began in the March issues of the publications selected, and will be continued throughout the balance of the present year.

There has been some misapprehension regarding the purpose of the publicity campaign, especially with regard to the motives back of it, in connection with the relations of the jobber in general to other elements in the industry.

The publicity campaign is directed primarily to increase the use and consequently the sale of electrical apparatus and supplies. Anything that retards the rapid introduction and wide distribution of electrical goods holds back the industry. The business of the jobber has been evolved out of the necessities of both producer and buyer. On the part of the producer there is and has always been, since the electrical industry assumed national proportions, a need for means to speedily reach all points of possible demand and the assurance of business in such quantity as would stabilize production. On the part of the buyer there is and has always been a need for access to stocks near at hand in such combinations that no matter how numerous nor how few his requirements might be from day to day, his wants might always be supplied at short notice, and at low cost.

In the great growth of the industry, the function of the Jobber has never been displaced, and the trade channels which have been established through the necessities of the producer and buyer have never been diverted. While, on the one hand, the functioning of the Jobber has contributed thus to the rapid development of the industry, this very development has, on the other hand, brought about many problems of distribution which have made this Jobber function more and more a necessary factor, and constant study of all of the elements entering into such distribution have been made to keep even the balance between economy and expediency.

The purpose of the Electrical Supply Jobbers' Association is to study through associated efforts the factors underlying the most intelligent methods of doing business, and to make available for the individual the lessons taught by the aggregate experience of all of its members. The statistics which the various committees of the Association are gathering are analyzed and business methods so adjusted as to keep

pace with the development of the electrical industry and the consequent increasing demand for Jobber representation.

This being the purpose of the Association, the purpose of the publicity campaign is to reveal to the trade definite information along these lines, so that every element interested, from producer to ultimate consumer, may understand clearly the advantages that all derive from a consistent adherence to a policy of Jobber distribution.

In carrying out the publicity campaign no effort is intended to usurp the function of other elements in the industry, nor to divert to the Jobber any recognition other than that which a fair and honest evaluation of his services inspires. In the benefits that may accrue all elements in the industry—non-members as well as members of the Association—will participate.

The Electric Light and Power Industry in the United States

According to a report about to be issued by Director Sam. L. Rogers, of the Bureau of the Census, Department of Commerce, the electric light and power stations in the United States during the year 1917 generated more than 25 billion kilowatt hours of electric energy, producing an income of more than a half billion dollars, and gave employment to more than 100,000 persons, whose salaries and wages aggregated nearly $100,000,000. The output in 1917 was more than double that for 1912 and more than quadruple the output for 1907.

This report, which was prepared under the supervision of Eugene F. Hartley, Chief Statistician for Manufactures, covers both commercial and municipal plants, but does not cover electric plants operated by factories, hotels, etc., which generate current for their own consumption; plants that were idle or in course of construction.

The figures show great strides in the industry during both of the five-year periods 1907-12 and 1912-17. The output of electric energy by the light and power stations increased at a considerably greater rate, and their expenses at a slightly greater rate, than their income; and the rate of increase in the number of persons employed was much smaller, particularly during the later five-year period, than that in the amount of business done.

The total number of establishments increased from 5,221 in 1912 to 6,541 in 1917, the latter comprising 4,224 commercial establishments. The increase indicated by these figures is somewhat misleading, since 2,296 new establishments came into existence between 1912 and 1917, but as a result of combinations in the commercial systems and various other changes, the net increase was only 1,320, comprising 565 commercial and 755 municipal stations.

The total income of the stations in 1917, of which 95.3 per cent represented electric service, amounted to $526,886,408, an increase of 74.3 per cent as compared with 1912 and of 200 per cent as compared with 1907. The total expenses were $427,136,049, or 82.1 per cent more than in 1912 and 218.3 per cent more than in 1907. The employes of the light and power stations numbered 105,546, an increase of 33 per cent over 1912 and of 121.6 per cent over 1907; and their salaries and wages aggregated $95,239,954, an increase of 55.7 per cent as compared with 1912 and of 168.9 per cent over 1907.

The total primary power in 1917 amounted to 12,857,998 horsepower, an increase of 70.8 per cent as compared with 1912 and of 213.7 per cent over 1907. Of this power nearly two-thirds—8,389,389 horsepower—was derived from steam; almost one-third—4,251,423 horsepower—from water; and the remainder—217,186 horsepower, or less than 2 per cent—from internal-combustion engines. The corresponding proportions for 1912 and 1907 differed but slightly from those just stated. The average horsepower per steam engine shows a very great increase—from 334 in 1907 to 631 in 1912 and to 1,124 in 1917. The average horsepower of the water wheels also shows a marked increase from census to census, but in the case of the internal-combustion engines there has been a decline.

The total dynamo capacity, 9,001,872 kilowatts in 1917, represents an increase of 74.3 per cent as compared with 1912 and 232.2 per cent over 1907, these rates of increase being slightly greater than the corresponding ones for total primary power. The output of electrical energy aggregated 25,438,611,417 kilowatt hours, an increase of 119.9 per cent for the period 1912-1917 and of 339.9 per cent for the decade. Of the 6,541 establishments reported for 1917, those which purchased all their electric energy from other establishments numbered 1,422, as against 507 in 1912 and 227 in 1907.

The horsepower of stationary motors served amounted to 9,216,323 in 1917, or 123.1 per cent more than in 1912 and 458.9 per cent more than in 1907. The figures indicate that the arc lamp for street lighting is being fast superseded by the incandescent of various types. The former class of lamps decreased in number from 348,643 in 1912 to 256,838 in 1917, the reduction amounting to more than one-fourth, while during the same period the number of incandescent lamps more than doubled, increasing from 681,957 to 1,389,382.

The figures are shown in detail in the accompanying table.

ELECTRIC LIGHT AND POWER STATIONS: 1917

UNITED STATES

	1917	1912	1907	Per Cent of Increase 1907-1917	1912-1917	1907-1912
Number of establishments	6,541	5,221	4,714	38.8	25.3	10.8
Commercial	4,224	3,659	3,462	22.0	15.4	5.7
Municipal	2,317	1,562	1,252	85.1	48.3	24.8
Income	$526,886,408	$302,273,398	$175,642,338	200.0	74.3	72.1
Electric service	$502,100,346	$287,138,657	$169,614,691	196.0	74.9	69.3
All other	$ 24,786,062	$ 15,134,741	$ 6,027,647	311.2	63.8	151.1
Total expenses, including salaries and wages	$427,136,049	$234,577,277	$134,196,911	218.3	82.1	74.8
Number of persons employed	105,546	79,335	47,632	121.6	33.0	66.6
Salaries and wages	$ 95,239,954	$ 61,161,941	$ 35,420,324	168.9	55.7	72.7
Total horsepower	12,857,988	7,530,044	4,098,188	213.7	70.8	83.7
Steam engines:						
Number	7,464	7,847	8,054	— 7.3	— 4.9	— 2.6
Horsepower	8,389,389	4,949,778	2,693,273	211.5	69.5	83.8
Internal-combustion engines:						
Number	2,946	1,116	463	536.3	164.0	141.0
Horsepower	217,186	111,035	55,828	289.0	95.6	98.9
Water wheels:						
Number	3,357	2,939	2,481	35.3	14.2	18.5
Horsepower	4,251,423	2,469,231	1,349,087	215.1	72.2	83.0
Kilowatt capacity of dynamos	9,001,872	5,165,439	2,709,225	232.2	74.3	90.7
Output of stations, kilowatt hours	25,438,611,417	11,569,109,885	5,862,276,737	333.9	119.9	97.3
Stationary motors served:						
Number	554,817	435,473	167,184	231.9	27.4	160.5
Horsepower	9,216,328	4,130,619	1,649,026	458.9	123.1	150.5
Number of street lamps:						
Arc	256,838	348,643	(2)	....	—26.3	....
Incandescent, etc.	1,389,382	681,957	(2)	....	103.7	....

(1) A minus sign (—) denotes decrease.
(2) Not available.

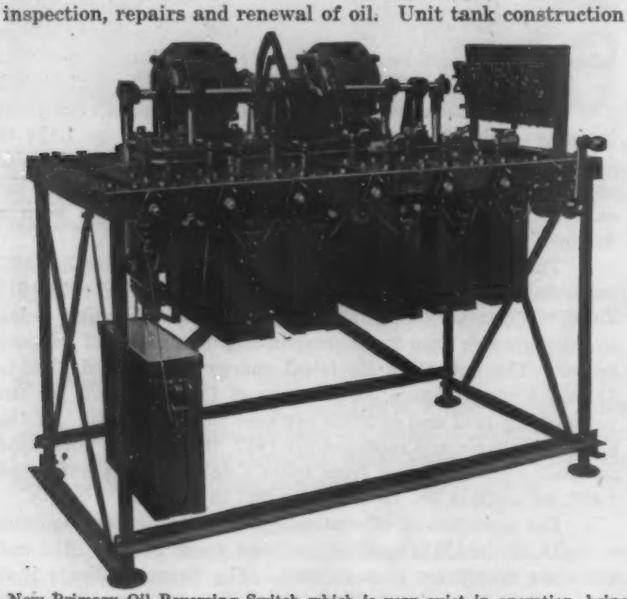
LATEST IN EVERYTHING ELECTRICAL

(A scientific dairy farm, equipped with numerous electric appliances, is described here, showing the extent to which electricity is being applied outside the towns. A new type of portable conveyor, an automatic farm lighting plant and other recent developments in the electrical world are also included in this series of notes.—The Editor.)

NEW OIL REVERSING SWITCH FOR LARGE MOTORS

High voltage slip ring motors built for steel mills, mine hoists and similar duty require some form of switch to connect the primary winding to the lines, especially so when the motor is used for reversing service. The accompanying illustration shows a new primary oil reverse switch that has several new and interesting features. It consists principally of two 3-pole switch units each operated by a high torque motor.

Among the unique features of this switch are the unit tank construction and the means of lowering the tanks for inspection, repairs and renewal of oil. Unit tank construction



New Primary Oil Reversing Switch which is very quiet in operation, being operated by two high torque motors

is used because it increases accessibility and saves time and labor in locating trouble and making repairs. A double windlass with cables and pulleys permits easy lowering of one or more tanks. In the end view one of the tanks is lowered and shows the simple construction of the stationary and moving members. It will be noted that the arc is broken horizontally rather than vertically. This construction allows the arc to rise to the point of rupture without burning parts not designed for such duty; and since the rupture takes place near the top of the oil, it is well away from all sediment—hence frequent inspections and renewals are unnecessary. The support for the stationary and moving members is bolted to a channel iron which in turn is bolted to the main frame, consequently in case of serious damage to any single pole unit the complete unit may be removed without disturbing any of the others.

The contactor panel shown at the extreme right is controlled from a master switch or push buttons and handles the motor currents. Very little current is required as the motors used have high resistance rotors. This particular reversing switch was made by The Cutler-Hammer Manufacturing Company of Milwaukee for a 1200 h.p. 200 volt mine hoist motor. It may be used for two motors on non-reversing service, or where only one non-reversing motor is required the switch is made with only one 3-pole unit and one motor.

WRINKLET SOCKETS WITH DETACHABLE BUTTONS

The Bryant Electric Company of Bridgeport, Conn., manufacturers of the Wrinklet Interchangeable Line of Lamp Receptacles and Sockets, have improved their push button socket designated as List No. 81, by making both buttons detachable. This is accomplished by moulding a threaded stud laterally into each of the buttons, the stud in the black or "off" button being of a larger diameter and a different thread from the stud moulded in the red or "on" button. This feature prevents transposition of the two buttons after the socket has been inserted in the fixture. Sockets with detachable buttons are necessary for installation in husks, socket covers, and other restricted locations.

Socket and detachable button

AUTOMATIC COMPENSATOR

An automatic compensator, put on the market by the Electric Controller & Manufacturing Company, has an operating magnet which is excited when the "start" button is pushed, and which closes the starting contacts for the motor, connecting the motor to a transformer for furnishing the starting voltage. As the motor speed increases, the current diminishes, and when the current has dropped to the right value, a transition relay allows the starting contacts to leave engagement and the running contacts to make engagement. This disconnects the motor from the transformer and the transformer from the line, and connects the motor to the line. When the "stop" button is pushed, the operating magnet is de-energized, the compensator falls to the "off," or "stop" position, and the motor stops. All of these operations, excepting pushing the "start" and "stop" buttons, are carried out automatically by the compensator itself.

An iron case with a removable cover contains the compensator, which operates submerged in oil. The case is dustproof and weatherproof and all exposed parts are dead electrically.

FARM POWER AND LIGHTING PLANT

A lighting plant which is started automatically as soon as any light anywhere on the system is turned on has been put on the market by the Automatic Light Company. The turning on of light or power closes the circuit of the relay and this in turn closes the switch on the starting motor which starts the engine. When 90 volts are reached, the 6-volt current cuts out and the 110-volt cuts in. This operation reverses when the last light or power is turned off and the plant then stops.

The engine is the company's own design, single cylinder, four cycle, valve in head motor, water cooled by a special percolator system that requires only four gallons of water and that keeps the cylinder between 230 and 240 degrees F.

The only battery in the plant is a standard six-volt for starting.

A novel feature is the voltage regulation. This is accomplished by an electric solenoid governor which acts directly on the throttle of the carburetor, opening and closing it to take care of the slightest variation in voltage, thus

producing a steady light direct from the generator and with high fuel economy.

SCIENTIFIC DAIRY FARM

Undoubtedly Briarcliff Dairy Farm, which is owned by Mr. A. D. Chandler of Atlanta, Georgia, is as modern and scientifically conducted as the most exacting customer would require. The barn is provided with concrete floors, wooden blocks, electric lights and fans, steel frame stalls, novel drinking fountains, milking machines, concrete feed troughs, electric equipment for the silo and bottling of milk.

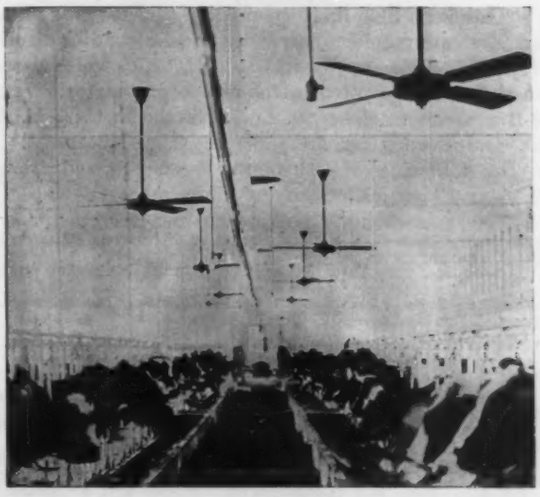
The farm has a colony of 180 full-blooded registered Holstein cattle. Their value is based on their direct proportional response in milk to scientific feeding and careful housing.

Modern stable of Briarcliff Dairy Farm of Atlanta, Georgia

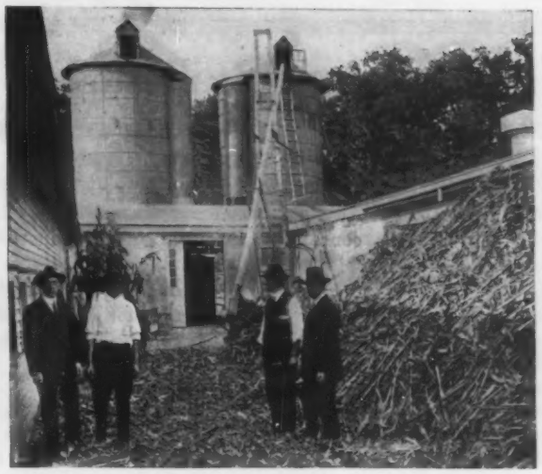
The interior of the barn is shown in Figure 1. It is absolutely clean and looks it. Fresh air and sunlight are supplied in abundance by the numerous windows on each side equipped for easy adjustment. The floors, walls and ceiling are concrete and also spell cleanliness. Westinghouse ceiling fans are shown cooling the atmosphere in summer and ventilating in winter. The electric lights are also shown. The steel rails and stanchions are easy to keep clean and occupy a small amount of space.

Individual drinking fountain for the cattle

Figure 2 shows the individual drinking fountains in the foreground. There is always a small amount of water in the bottom of the cement cup to entice the cow, for she is as dumb in regard to mechanics as fastidious about some other things. When she makes the attempt, unconsciously she forces the valve open and hence always has fresh water. The feed trough shown, facilitates handling hay ensilage and grain and makes scientific feeding possible.



Stable showing double row of Holstein cattle and Westinghouse electric fans



Silo at Briarcliff Farm being filled by aid of Westinghouse motor

The green corn for ensilage is cut with the aid of a type C. S. 15 h.p. motor, and is blown through a conveyor into the top of a forty-foot silo. Mr. Candler considers green corn ensilage as the next best thing to green grass as a milk producing food.

All of the milking is done with the Vacuum Milking Machine, thus preventing any dirt from getting into the milk. The milk flows into an air-tight bucket, is emptied into a larger can and carried to the milk house. Just as soon as the milk arrives at the milk house it is strained and passed over a cooler until it reaches the proper temperature. From here it passes to a bottle filling machine, where the bottle is automatically filled and sealed.

View of stable showing milking machine

Books and Bulletins

Fuel Facts

Fuel Facts, second edition (revised), published by the United States Fuel Administration December, 1918, is a booklet of 64 pages containing information for consumers and savers of fuel. This little work is very valuable in its suggestions looking toward the saving of fuel and the data on world production of coal, petroleum, and hydroelectric power (developed and undeveloped) will prove of timely service in power development in the West.

Principles of Combustion

"Principles of Combustion in the Steam Boiler Furnace" is a recent booklet, by Arthur D. Pratt. Its size is 6 by 9 in.; 114 pp.; tables, charts and diagrams; cloth binding. Published by The Babcock & Wilcox Company of New York City. Power plant owners are coming more and more to appreciate the necessity for intelligence in the boiler room—the reinforcing of experience in firing by a full knowledge of the theory of combustion. In this excellent booklet the author, who is assistant to the advisory engineer of The Babcock & Wilcox Company, sets forth in clear, concise form the fundamental principles involved in combustion. After establishing the theory, simple examples are worked that illustrate the principles involved and the formulas deduced. First the chemistry of combustion is discussed, followed by chapters on density, weight, volume of gases, heat of combustion, specific heat, air and combustion, and combustion formulas. The two concluding chapters on the computation of combustion data and the heat balance are excellent.

Platinum From Black Sand

Technical Paper 196, "Notes on the Black Sand Deposits of Southern Oregon and Northern California" has just been issued by the Bureau of Mines.

As a result of the unusual demand for platinum in the manufacture of materials needed in war, the Bureau of Mines, Department of the Interior, decided to investigate some of the more promising localities on the Pacific Coast where gold and platinum are known to be associated with such minerals as magnetite, chromite and ilmenite, with various siliceous minerals, the aggregate constituting what are commonly known as "black sands."

The results of the investigation may be summarized by the statement that in general the black-sand deposits are disappointing in both value and quantity; they rarely contain enough gold and platinum or occur in adequate quantity to be exploited at a profit.

Upbuilding the Industry

The testimony before the senate committee on interstate commerce and statements bearing on the return of the railroads of the United States to private management and operation and on remedial action to accompany such return as suggested by the Association of Railway Executives are gathered together in pamphlet form and published under the title of "Remedial Railroad Legislation—1919."

"Representation in Industry" is the subject of a little booklet by John D. Rockefeller, Jr., which deals with the relations of employer and employe.

Two pamphlets on customer ownership have been gotten out by Wm. H. Hodge, Manager of the Publicity Department of H. M. Byllesby & Company, showing the benefits to the companies and to the public, and advocating the plan as an "American solution" of the relations between the utility and the community. The titles of these booklets are "Customer Ownership" and "Rational Public Ownership."

The war time aspects of illumination as a means of defense of property are covered in an interesting report which was prepared for the U. S. Government by the committee on war service of the Illuminating Engineering Society, and is published as War Department Document No. 800 under the title "Protective Lighting."

Of Engineering Interest

"Typical Specifications for Bituminous Road Materials" by Prevost Hubbard and Charles S. Reeve, and "Drainage Methods and Foundations for County Roads" by E. W. James, Vernon M. Peirce and Chas. H. Moorfield, are the titles of bulletins Nos. 691 and 724 respectively of the U. S. Department of Agriculture. Both are illustrated with charts and half tones.

Bulletins Nos. 105 and 106 of the University of Illinois deal with "Hydraulic Experiments with Valves, Orifices, Hose, Nozzles and Orifice Buckets" which were conducted by Arthur N. Talbot, Fred B. Seely, Virgil R. Fleming and Melvin L. Enger, and a "Test of a Flat Slab Floor of the Western Newspaper Union Building" by Arthur N. Talbot and Harrison F. Gonnerman.

The flow of water through one and one-half inch pipe and valves is the subject of a paper by Frederick W. Greve, Jr., which has been published as Bulletin No. 1 by the Engineering Experiment Station at Purdue University.

A compact little booklet has been issued by the A. Lietz Company of San Francisco, manufacturers of engineering, mining, surveying and nautical instruments, giving data on solar events under the title of "Solar Ephemeris, 1919." The little handbook will prove most useful for surveyors and engineers.

Electrical Apparatus

A revised edition of the Westinghouse Catalogue 3-B listing instruments and relays has recently been issued by that company. Several new types of apparatus are included and wherever possible one type is described on one page, thus making it easy to locate what you are looking for.

The Smith-Serrell Company of New York has gotten out a bulletin on the Pintite Rigid Coupling for line shafts which is described as non-slipping, simple and safe.

"Circle T" Externally Operated Switches are described in Bulletin No. 2 of the Trumbull Electric Manufacturing Company which gives descriptions, illustrations and price quotations. A pocket edition of the same bulletin gives the same data in letter folder size convenient for general use.

Two bulletins have recently been received from the Roller Smith Company, "4" Imps," direct current ammeters and voltmeters for small switchboards, and "Industrial" Type Circuit Breakers of simple and rugged design.

"This Tells How the Other Fellow Did It" is the heading of an interesting folder issued by the Electric Controller & Manufacturing Company of Cleveland, Ohio, which describes a push button operated automatic compensator. Bulletin 1042-B gives more elaborate details of the E. C. & M. Automatic Compensator for A.C. Squirrel Cage Motors.

The following bulletins have been received from the Delta Star Electric Company of Chicago:

Bulletin No. 34—High Tension Outdoor Universal "Unit Type" Bus bar and Wiring Supports"—a 48 page catalog attractively illustrated with details of size and price.

Bulletin No. 302—Three Phase Low Tension Equipment up to 600 volts.

Addenda Bulletin No. 31A—"Unit Type" Indoor Bus Supports. All are punched for binding.

General Electric Company bulletins recently sent out include:

125 and 250 volt D.C. Small Plant Standard Unit Panels—Bulletin 47050A.

C R 2940—Push Button Stations for use in the Control Circuits of all types of Magnetic Control.

C R 3100—Drum-type Controllers for Cranes, Hoists and Similar Service.

C R 3105—Drum-type Controllers for Use with D.C. Adjustable-speed Motors.

Magnetic Control for Machine Tools for D.C. Motors.

Bureau of Mines Publications

The following are among the publications received from the Bureau of Mines:

Abstracts of Current Decisions on Mines and Mining from May to December, 1918, Bulletin 174—from January to May, 1918, Bulletin 172, by J. W. Thompson.

Inflammability of Aluminum Dust—Technical Paper 152—by Alan Leighton.

Mining and Milling of Lead and Zinc Ores in the Missouri-Kansas-Oklahoma Zinc District—Bulletin 154—by Clarence A. Wright.

Methods of Shutting Off Water in Oil and Gas Wells—Bulletin 163—by F. B. Tough.

Bibliography of Petroleum and Allied Substances—Bulletin 149—by E. H. Burroughs.

Gold dredging in the United States—Bulletin 127—by Chas. Janin.

Innovations in the Metallurgy of Lead—Bulletin 157—by Dorsey A. Lyon and Oliver C. Ralston.

Rock Quarrying for Cement Manufacture—Bulletin 160—by Oliver Bowles.

Miners' Safety and Health Almanac for 1919—Miners' Circular 24—compiled by Dr. R. C. Williams.

Fume and other Losses in Condensing Quicksilver from Furnace Gases—Technical Paper 96—by L. H. Duschak and C. N. Schuette.

The Quick Determination of Incombustible Matter in Coal and Rock Dust Mixtures in Mines—Technical Paper 144—by A. C. Fieldner, W. A. Selvig and F. D. Osgood.

Method of Least Squares Applied to Estimating Errors in Coal Analysis—Technical Paper 171—by J. D. Davis and J. G. Fairchild.

Effects of Moisture on the Spontaneous Heating of Stored Coal—Technical Paper 172—by S. H. Katz and H. C. Porter.

Use of the Interferometer in Gas Analysis—Technical Paper 185—by Frank M. Seibert and Walter C. Harpster.

Central Station Heating—Its Economic Features with Reference to Community Service—Technical Paper 191—by John C. White.

Use of the Hydrogen-Volatile-Matter Ratio in Obtaining the Net Heating Value of American Coals—Technical Paper 197—by A. C. Fieldner and W. A. Selvig.

Sulphur Dioxide Method for Determining Copper Minerals in Partly Oxidized Ores—Technical Paper 198—by Charles E. Van Barneveld and Edmund S. Leaver.

Colloids and Flotation—Technical Paper 200—by Frederick G. Moses.

Labor Saving at Limestone Quarries—Technical Paper 203—by Oliver Bowles.

Economic Operation of Steam Turbo-Electric Stations—Technical Paper 204—by C. T. Hirshfeld and C. L. Karr.

Coke Oven Accidents in the United States—Technical Paper 206—by Albert H. Fay.

How to Improve the Hot-air Furnace—Technical Paper 208—by Charles Whiting Baker.

Accidents at Metallurgical Works in the United States—Technical Paper 215—by Albert H. Fay.

Saving Coal in Steam Power Plants—Technical Paper 217—Reprint of a bulletin of the U. S. Fuel Administration.

Review of the Manganese Situation—by C. M. Weld.

Preparation of Crucible Graphite—by George D. Dub.

Problems Involved in the Concentration and Utilization of Domestic Low-Grade Manganese Ore—by Edmund Newton.

Miscellaneous

A bulletin has been sent out by the Commercial and Industrial Museum of Montreal calling attention to their permanent exhibit of All Commodities of the World. Free space is offered to manufacturers to make their goods known in Canada.

"The Bulk Shipment of Grain from the Columbia River Basin" was featured by the Oregon Society of Engineers in an attractive publication representing No. 1 of Vol. 2 of the Society Journal.

A Reconstruction Program

The Institute of Electrical Contractors of New York publishes for private distribution an interesting little booklet by Sullivan W. Jones, entitled "A Reconstruction Program for the Building Industry." As a straightforward study of the problems of contractor and architect it will inevitably be appreciated by all who are concerned with building operations.

114 Proved Plans to Save a Busy Man's Time

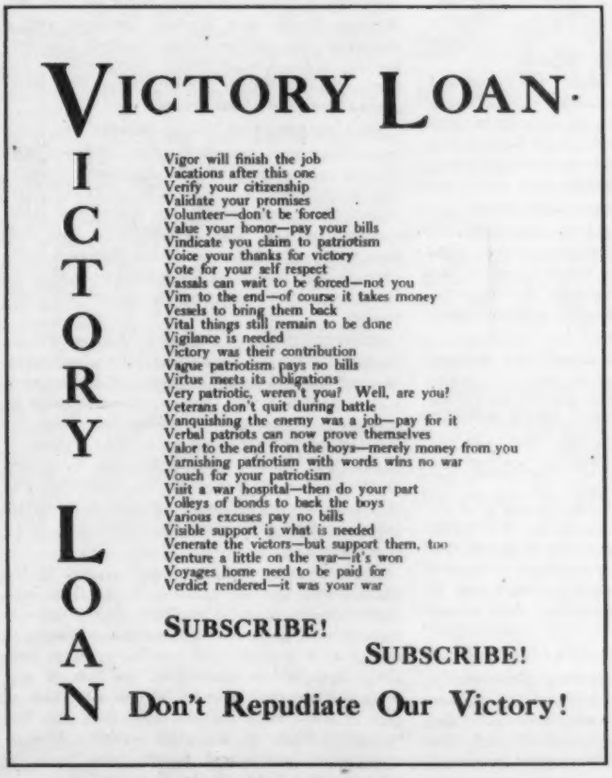
Compiled by A. W. Shaw Company. Size 5½ x 8½ in.; 160 pp.; 28 illustrations; cloth binding. Published by A. W. Shaw Company and for sale by the Technical Book Shop, San Francisco. Price $4.50, given with an 18 months' subscription to System Magazine.

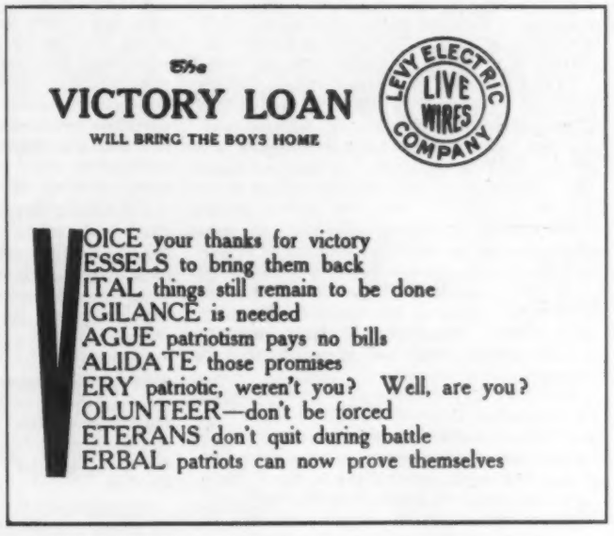
The short cuts which are the result of personal experience are of more value than the treatises of theorists, and in confining this volume to actual discoveries of practical business men, the compilers have succeeded in making it a really valuable handbook for those to whom time is money. It is clearly divided into brief sections, one for each plan, and carefully indexed for ready reference.

Logarithms of Hyperbolic Functions to Twelve Significant Figures

By Frederick E. Pernot and Baldwin M. Woods. Size 10½ x 7 in.; 467 pages. Published by the University of California.

These exhaustive tables are a very timely and invaluable contribution to the engineering world. Their authors have already achieved no little distinction in the realm of mathematics, and this volume will add considerable weight to their reputation, besides supplying a very definite need.


VICTORY LOAN
VICTORY LOAN
Vigor will finish the job
Vacations after this one
Verify your citizenship
Validate your promises
Volunteer—don't be forced
Value your honor—pay your bills
Vindicate you claim to patriotism
Voice your thanks for victory
Vote for your self respect
Vassals can wait to be forced—not you
Vim to the end—of course it takes money
Vessels to bring them back
Vital things still remain to be done
Vigilance is needed
Victory was their contribution
Vague patriotism pays no bills
Virtue meets its obligations
Very patriotic, weren't you? Well, are you?
Veterans don't quit during battle
Vanquishing the enemy was a job—pay for it
Verbal patriots can now prove themselves
Valor to the end from the boys—merely money from you
Varnishing patriotism with words wins no war
Vouch for your patriotism
Visit a war hospital—then do your part
Volleys of bonds to back the boys
Various excuses pay no bills
Visible support is what is needed
Venerate the victors—but support them, too
Venture a little on the war—it's won
Voyages home need to be paid for
Verdict rendered—it was your war
SUBSCRIBE!
SUBSCRIBE!
Don't Repudiate Our Victory!


VICTORY LOAN
WILL BRING THE BOYS HOME
LEVY ELECTRIC
LIVE WIRES
COMPANY
VOICE your thanks for victory
VESSELS to bring them back
VITAL things still remain to be done
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VAGUE patriotism pays no bills
VALIDATE those promises
VERY patriotic, weren't you? Well, are you?
VOLUNTEER—don't be forced
VETERANS don't quit during battle
VERBAL patriots can now prove themselves

The "V" slogans originated by the Journal of Electricity and run on each page of the April 1st number did good work for the Victory Loan campaign. Here are two instances in which they were reproduced, that on the left in the form of a poster in use by a precinct committee of Los Angeles, and one the right on a little blue card issued by the Levy Electric Company of San Francisco.

NEW ELECTRICAL DEVELOPMENTS

(Lighting plans constitute the bulk of the new developments in the Northwest, while the activities of the Pacific Central District are notable for several important power projects under way. The Southwest reports among other avtivities various irrigation plans of importance. The Inter-Mountain news reports improvements along several lines of electrical interest.—The Editor.)

THE PACIFIC NORTHWEST

REEDSPORT, ORE.—The Reedsport Power & Light Company has contracted with the Marshfield Electric Company for installation of a plant and distributing system here.

CLOVERDALE, B. C.—The British Columbia Electric Company is planning to extend its transmission lines to Surrey Centre to furnish electricity for lamps and motors there.

SEATTLE, WASH.—Appropriations aggregating $36,709.86 for extensions and improvements in the city lighting system have been approved by the finance committee of the city council.

CHEHALIS, WASH.—At the special election held recently the proposal to grant the Washington-Idaho Light & Power Company of Clarkston a franchise to supply electricity in Chehalis was carried.

SEATTLE, WASH. — NePage-McKenny Company, Armour building, Seattle, was awarded a contract for installation of the electrical equipment in the $24,000 building to be erected at Bremerton, Wash., by the Bremer estate.

SPOKANE, WASH.—The $2,000,000 plant of the Spokane Heat, Light & Power Company, this city, has been sold for $400,000 by Receiver Ludwig Kemper to F. C. Paine of the Union Trust Company and E. P. Twohy, an attorney.

BURNS LAKE, B. C.—Messrs. F. R. Keefe and Charles Wallace propose erecting a dam on the Stellace river, near Burns Lake, and using the power produced to operate a large mill, construction on which will be commenced very soon.

VANCOUVER, WASH.—Proceedings to establish an improvement district embracing Washington street, for the installation of cluster lights along the main thoroughfare leading from the Interstate bridge, were launched at the Commercial Club and unanimously endorsed.

DALLAS, ORE.—The Dallas division of the Mountain States Power Company during the week ended April 15 closed a contract with the Willamette Valley Lumber Company for an additional 80 horsepower in motors, covering requirements of the new box factory to be erected at once.

SQUAMISH, B. C.—A contract has been awarded by the provincial government of British Columbia for the construction of a hydroelectric plant at Squamish to Robertson & Partners, Metropolitan Building, Vancouver, B. C., to cost about $72,000. The plant will supply electricity for the railway shops and other industries in Squamish.

VANCOUVER, WASH.—At a recent meeting of the Better Government League a decision was made to begin a campaign at once through the different civic organizations for construction of a hydroelectric power plant to supply light, heat and power for lower Columbia basin residents at cost. It is the intention to have the government construct and own the plant.

SEATTLE, WASH.—A contract amounting to approximately $100,000 was awarded to the Pacific Lamp & Supply Company by the Board of Public Works at its regular weekly meeting. The contract calls for the furnishing of the city with incandescent light bulbs for the ensuing year. To Seattle Hardware Company a contract was awarded for supplying certain pipe at a cost of $4210.

SEATTLE, WASH.—The estimated cost of operating the Seattle municipal railway in May will be $362,645, according to Superintendent Thomas J. Murphine. The total is about $60,000 more than the April estimate. The difference includes an increase in the transportation department, due, it is said, to the operation of more cars and the expense of making improvements in the property.

SEATTLE, WASH.—The sum of $520,000 of street railway utility bonds for various extensions and betterments is proposed in a bill introduced in council. Among the improvements proposed will be the double tracking of the Fauntleroy line on Avalon Way, connection of Lake Union with the Madrona lines at 34th avenue, and extension of lines on the south approach to Ballard bridge.

BELLINGHAM, WASH.—A power and light company has been formed by the employes of the power company at Bellingham. It is building a transmission line into the town of Ferndale, Washington, with a view to supplying power and light to that community. The chief user of power at Ferndale will be the milk condenser. The manager of the company which is constructing this line is R. U. Muffley, superintendent of power and light for the Puget Sound Traction Light & Power Company at Bellingham.

THE PACIFIC CENTRAL DISTRICT

ORLAND, CAL.—The installation of an ornamental lighting system in the business district is under consideration.

WOODLAND, CAL.—It was announced here that a complete reorganization of the financial affairs of the Yolo Water and Power Company has been effected.

VALLEJO, CAL.—It was reported here that plans are already under way for the rebuilding of the plant of the Contra Costa Gas Company which was destroyed by fire recently.

RICHMOND, CAL.—Recently the electrical dealers of Richmond conducted an electric range campaign which resulted in the sale of 15 electric ranges and three electric water heaters and produced a large additional list of prospects, many of whom will purchase later.

OAKLAND, CAL.—Superior Judge Brown denied the motion of the Great Western Company for retrial of the suit in which the city of Oakland secured judgment for $90,000 against the company. The money represents delinquencies in the payment for the electric lighting franchise.

FRESNO, CAL.—The Modesto and Turlock irrigation districts are about to launch a project for the building of a dam to cost $3,000,000 on the Tuolumne river a few miles above the present La Grange dam, which now impounds the water of the Tuolumne river for use of the districts.

SACRAMENTO, CAL.—Commissioner of Public Works Thomas Coulter presented to the city commission an ordinance granting to the Pacific Gas and Electric Company a franchise to operate its jitneys on the loop connecting its J and M street car lines with a portion of East Sacramento.

BUTTE CITY, CAL.—Three of the big 26-inch pumps at the Sidds Landing plant of the Princeton-Codora-Glenn Irrigation District have been started, and an ample supply of water for rice and all other crops is being delivered. The three 26-inch pumps at the Princeton plant will be started in a few days.

EUREKA, CAL.—Another boat was launched recently by the Rolph Shipyards and plans are under way to lay the keel for another. The shipyards are contemplating installation of 100 horsepower in motors for the operation of fire protection apparatus. Current will be supplied by the Western States Gas & Electric Company.

FRESNO, CAL.—The California Packing Corporation of Fresno is planning to erect an electric power plant in connection with its new factories. The proposed plant will be equipped with mechanical and electrical equipment, including automatic machinery for handling and packing. Philip Bush, 101 California street, San Francisco, is engineer.

CHICO, CAL.—For the purpose of studying electric lighting systems over the state, with the object of taking over the local distribution system, City Trustees O. E. Tracy, Martin Polk and City Clerk Ira Morrison are making a tour of California cities owning their own distribution systems. The newly elected board of trustees is strongly in favor of municipal ownership of public utilities.

GREENVILLE, CAL.—Several officials of the Great Western Power Company, including President Fleishhacker and Superintendent Beardsley, are making a tour of inspection of the company's holdings in this vicinity. After a visit at Lake Almanor, the company's storage reservoir, they will proceed into Butt Valley, where a new power plant is to be built at an expenditure of $7,500,000.

TULARE, CAL.—A series of fires, believed to have been due to insulators which were damaged during a recent rain storm, destroyed poles carrying the high tension wires of the Mt. Whitney Power and Electric Company over a stretch of the service system between here and Delano, a distance of nearly thirty miles. The service of the Tulare water system was interrupted for over three hours.

SAN FRANCISCO, CAL.—Surveys are being made for a dam site on Pit river above Copper City in connection with the proposed hydroelectric development by the Pit River Power Company. The plans provide for two power developments to cost about $17,500,000. The first dam will be located near Sheep Rocks, 4 miles from Copper City, and the second dam is to be 12 miles up the river near the mouth of Totem creek.

OROVILLE, CAL.—Scores of landowners attended the Honcut conference on the organization of an irrigation district. The sentiment was favorable to the project, but difference of opinion as to the proper boundaries caused the appointment of a committee to take charge of the project. The committee includes E. Abbey, H. S. Munson, E. Biggs, H. H. Armstrong and C. M. Hill. The proposed district will include approximately 3700 acres in Butte and Yuba counties.

CHICO, CAL.—The irrigation project of the Phelan and Parrott ranches which has been under construction for the past two months is rapidly nearing completion and the engineers in charge of the project plan to have water running through the ditches by the last of this week. More than a mile of 60-inch redwood pipe and the same amount of 48-inch pipe has been laid from the pumping station. Five of the 20-inch centrifugal pumps have been installed and will shortly be in operation.

RED BLUFF, CAL.—The formation of an irrigation district under the California Wright Act is to be started at once. This plan was decided upon as a step toward furthering the interests of the Iron Canyon Project, at a joint meeting of the members of the Red Bluff and Corning Chambers of Commerce. By joint cooperation the Corning body will secure the signatures of land owners south of Thomas Creek and the local organization will sign up those to the northward. When all land owners have been signed up there will be a meeting held to perfect organization.

FRESNO, CAL.—Work has begun on the $2,500,000 power plant on the San Joaquin River a half mile above Big Sandy, near Auberry, according to a statement made by the San Joaquin Light and Power Corporation. Roads are being built for the conveyance of material; a start has been made on the tunnel which taps the river six miles above the site of the power plant. A dam is also being built on the river at the entrance to the tunnel. The tunnel was chosen for feeding the power house because by its use a vertical fall of 400 feet can be given the water.

SACRAMENTO, CAL.—The Northern California Power Company, which in addition to selling energy to the Pacific Gas and Electric Company, serves the north end of the Sacramento Valley, was given authority by the State Railroad Commission recently to add a surcharge of 10 per cent to its rates. The surcharge will not apply to competitive territory ih Butte and Colusa counties. The Commission in its decision held that 1919 expenses of the company will be increased over those of 1918, and that with the surcharge the company will make about 6.63 per cent upon its estimated capital of $8,116,007 for this year.

WILLOWS, CAL.—Endorsement and support for the Iron Canyon project is pledged in a resolution unanimously adopted here by the Willows Chamber of Commerce, and William Durbrow, president of the Farm center, was authorized to name a Chamber of Commerce committee to devise ways and means to form a Wright Act irrigation district in this county in furtherance of the project. It is planned that approximately 100,000 acres of Glenn county lands shall be embraced in the district formed here. This will be the second district in the project in which steps have been taken toward organization.

EUREKA, CAL.—The first step in what is to lead to the completion of the Klamath Falls Municipal Railroad to Sprague river, was taken when the city council passed a resolution waiving the terms of payment under the contract with Robert E. Strahorn. The meaning of this resolution, stripped of all legal persiflage, is that the city anticipates an action that would have to be taken about July 1, or whenever Strahorn completes the line to Dairy. There is still a balance of $16,770.13 remaining of the $300,000 that the city was to pay for building the line to Dairy. This money has been turned over to Strahorn.

BAKERSFIELD, CAL.—The executive committee of the new irrigation project for the purpose of getting water to not less than 300,000 acres of desert land in Fremont Valley and Indian Wells, met in the Lankershim Hotel in Los Angeles and reports were made by members who had carried on investigations as requested. From the available information at hand it appeared possible that by cooperation with the various interests already vested in the water sheds in Kern and Inyo counties sufficient water could be conserved to irrigate in the two counties the semi-arid lands to the extent of not less than 300,000 acres. A committee was appointed to gather additional information.

FRESNO, CAL.—Plans will be completed within sixty days and construction will start early in the fall on the new substation and shops of the San Joaquin Light & Power Corporation at a location on the west side of the Southern Pacific extending from Divisadero to Belmont streets, which will substitute the present substation at Fresno and N streets. This announcement was made by General Manager A. G. Wishon. He added that a general office building, erected along the most modern lines, may ultimately be built adjoining it. The proposed new substation will include a general repair shop, a garage where repairs will be done on most of the company's 200 cars and trucks now in service, a large store-room, a paint shop, and offices for the general shop and the storeroom.

THE PACIFIC SOUTHWEST

POMONA, CAL.—The Southern Counties Gas Company will make an extension to their main on Central avenue from Holt to Eighth.

LOS ANGELES, CAL.—A permit has been granted to the Clune Production Company for the erection of a power plant.

ALBUQUERQUE, N. M.—The Chamber of Commerce is working hard to raise subscriptions towards the extension of the electric car line on Fourth street.

LOS ANGELES, CAL.—The Government proposes to construct a dam in Gila river 10 miles above Florence for the storage of water for the irrigation of 70,000 acres of land.

LOS ANGELES, CAL.—The installation of an ornamental lighting system on Westmoreland Place between Seventh street and Wilshire Boulevard has been authorized by the city council.

SANTA FE, N. M.—The council has appointed a committee to call on the Water & Light Company with reference to purchasing its plant, and to name an engineer for appraising the plant.

CALEXICO, CAL.—The trustees have passed an ordinance calling for an election May 27, 1919, to vote on bonds; $165,000 for a municipal gas plant and $160,000 for a municipal light plant.

RIVERSIDE, CAL.—Lynch & Lynch, civil engineers of Los Angeles, have been employed to make plans and specifications for the Beaumont irrigation district. Work on the ditches is to begin at once.

CHINO, CAL.—Application has been made to the Board of Trustees by the Southern Counties Gas Company for a franchise to lay and maintain a pipe line, etc., through the streets of the city for the distributing of gas for heat, light, etc.

GALLUP, N. M.—The Gallup Electric Light & Power Company, recently incorporated, will take over the electric light and power plant owned by Gregory and associates. The plant, it is understood, will be enlarged and the service improved.

LOS ANGELES, CAL.—If the deal can be completed within the next week or so for the purchase of the Edison system, there is a possibility that the purchase proposition and necessary power bond issue will be submitted to the voters before July 1.

BENSON, ARIZ.—About 10,000 new acres of land are to be irrigated by the Benson Canal Company. Plans made by R. V. Leeson of Kansas City for a diversion dam and head works on the San Pedro river have been accepted. The irrigated area is to be on the east side of the stream. The cost is about $18,000.

BRAWLEY, CAL.—The Board of City Trustees has engaged the Olmstead & Gillilen Company, engineers, Los Angeles, to prepare plans and supervise the construction of the proposed municipal electric light plant. It is proposed to install two units of 250 kw. each. The minimum cost is placed at $116,000.

LOS ANGELES, CAL.—Application has been made to the Board of Supervisors for a franchise granting the right to construct along and across certain highways, in certain districts of Los Angeles county, a pipe line system for not more than two pipe lines for the transportation and distribution of mineral oil, and to construct a telephone system in connection therewith.

RIVERSIDE, CAL.—H. N. Siegfried, commercial agent of the Nevada-California Power Company, stationed at Riverside, Cal., has just completed a report to F. Mechling, Nevada manager, on the cost of installing a power line to supply the Simon Lead Mining Company, 20 miles east of Mina. The report will form a basis for a decision when the officers of the respective companies get together.

SANTA FE, N. M.—The Arroyo Honda irrigation project four miles south of here will go forward. Engineer James A. French has gone over the ground and will install a new dam above the old one, and between it and the big storage dam, which will be raised 10 to 30 feet. It is planned to make a 2000 acre project, including a concrete storage basin below the dam. The South Santa Fe Land & Development Company has the project in hand.

THE INTER-MOUNTAIN DISTRICT

SALT LAKE CITY, UTAH.—Improvements to the waterworks supply lines, power plants, etc., to cost about $1,000,000, are contemplated by the city council.

CEDAR CITY, UTAH.—The city council is negotiating with the Dixie Power Company to remove its electric poles from the main street into the block centers.

SALT LAKE CITY, UTAH.—Utah Power and Light Company, including the Western Power Company, reports for March gross earnings of $458,258, a gain of $14,568, or 3 per cent.

DILLON, MONT.—Plans are under consideration for the installation of a new street-lighting system and paving the streets. The cost of the entire work is estimated at about $80,000.

ST. GEORGE, UTAH.—Dixie Power Company is making plans to build additional plants to take care of rapidly growing demands for power in territory which they serve in southern Utah.

GRACE, IDAHO.—Election held on the bond issue to purchase the Grace Lighting System carried with an overwhelming vote. The bond issue was for $15,000, which will pay for the lighting system and leave enough surplus to make the system first-class in every respect.

SALT LAKE CITY, UTAH.—A group of local capitalists have made application to the State Engineer for 100 cubic feet of water from Logan River, in Cache county, for the irrigation of a tract of land containing 9,440 acres. It is the intention of the syndicate to spend approximately $100,000 on an electrically operated pumping plant.

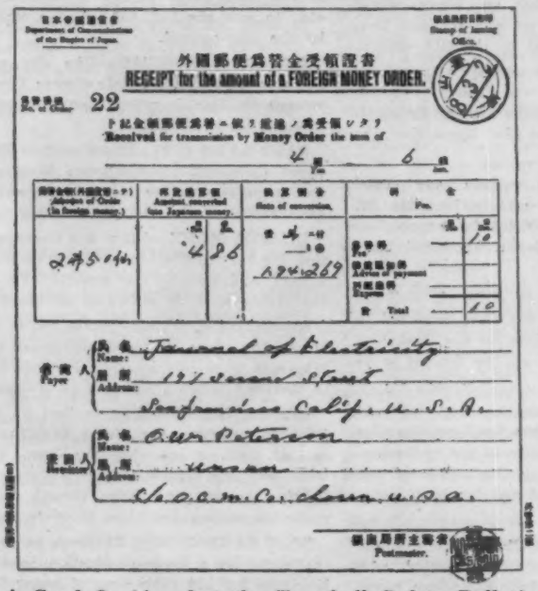
SALT LAKE CITY, UTAH.—Testimony is being taken by the Utah Public Utilities Commission in connection with the application for increased rates, freight and passenger, by the Bamberger Electric Railroad Company. The company is asking for sufficient increase to make their rates conform to the schedule applying to federal controlled roads.

SALT LAKE CITY, UTAH.—The Blue Creek Irrigation Company, by Roy Bullen of Logan, has filed application with the state engineer for permission to increase the height of its existing dam on Blue Creek in Boxelder county, 8 feet. D. O. Shurtz and J. R. Shurtz of Escalante are each asking for a second foot of water from Pine Creek, in Garfield county, to irrigate holdings of 80 and 65 acres respectively.

THE VACUUM CLEANER —— THE VACUUM CLEANER

IT IS THE LARGE STREAM which is harnessed for water power, but you will note that the brook receives most of the poet's praise—and there have been those who found their perfect pleasure in contemplation of a raindrop. It is not the size, nor even serious purpose of the literary gem which gives it value. Similarly there are many small items which come into the life of an editorial room which, although not powerful rivers, yet have their value as has the brook, the spring—or even the cloudburst. The office vacuum cleaner collects these items and is here permitted to present them in an array which, although it sounds damp, is by no means tearful.—The Editor.

Korean Money may look different from American, but except for the occasional intelligibility of the hieroglyphics it may be transmitted through the mails much as our own. Here is a Korean money order sent in payment for a year's subscription to the Journal of Electricity from Unsan, Chosen:



A Good One is what the Trumbull Safety Bulletin calls this pun which they credit to G. S. Martin of the supply department of the Canadian General Electric Company at Toronto.

"To win you have got to be
A 'Good Win'
And Plan to Win Good
Or be a 'Wooden One.'
A good plan to Win
Is to bring the Goodwin Plan in.
If you don't see the point—get a pin.
I'm all in."

They Do Things in a Big Way in the Army, even to the telling of yarns. A new use for construction equipment has been "invented" by an ingenious doughboy now with an engineer regiment in France, according to Engineering and Contracting. Writing to his home town newspaper he describes the army kitchen as follows:

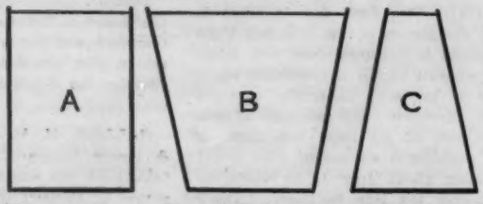
The building is 928 ft. long and 300 ft. wide and its takes 18 firemen to keep it warm enough to work in. We have 579 cooks and 700 on kitchen police duty. We mash our potatoes with a piledriver and grind our coffee with a 350 h.p. Liberty motor. Our empty pans are hauled out on railroad trains. The kitchen police go around on roller skates. The mess sergeant rides around on a motorcycle shouting orders through a megaphone. Now for flapjacks, we mix the batter with 12 concrete mixers. We also have steam shovels moving egg shells away from the door and six kitchen police with bacon rinds strapped on their feet keep the griddles greased.

The "Made in Germany" mark was discovered by Capt. R. W. A. Brewer on some postcards for sale in San Francisco shops the other day, according to a recent item in the newspaper. They were being innocently sent overseas to the boys. This same little mark is found on many of the postcards which the boys are sending home—but it is received with

no such disfavor. Here is a "Made in Germany" card, for instance, which was sent from the Rhine by Paul H. Manchester, formerly connected with the P. G. & E. Co. of San Francisco, who has recently returned from overseas to be mustered out in this country. This gives an idea of where our troopers were located in Germany. The fine old castle, built probably in the 15th century, was staff quarters. Modern conveniences in the old structures are rare and the Americans were not satisfied until they hauled a generator set to the top of the hill with a small tank and had installed electric lights—the first on the hill. Illuminated crosses were placed on the peak at Christmas time and kept lighted all night long, even though it necessitated the maintaining of night shifts for the job.

ENGINEERS OF YESTERDAY—9. PASCAL

(A Series Compiled by A. L. Jordan)



If three tanks A, B and C have equal bases, is the pressure (lbs. per sq. in.) the same on each base; and in spite of the fact that the weight of water is greatest in B and least in C, is the total force on the bottom the same?

Blaise Pascal (b. in Auvergne, France, in 1623) showed that the pressure is the same (since that depends only upon the depth and the kind of liquid) and therefore the total force (pressure times area) is the same. The fact that this force is independent of the shape of the vessel, which he also proved by experiment, is called the "hydrostatic paradox." He was a well known mathematician at an early age but his greatest practical discovery was that of the hydraulic press, in 1653. It was announced in these words: "A vessel full of water is a new principle of mechanics and a new machine for multiplying forces to any degree we choose."

THE VACUUM CLEANER —— THE VACUUM CLEANER